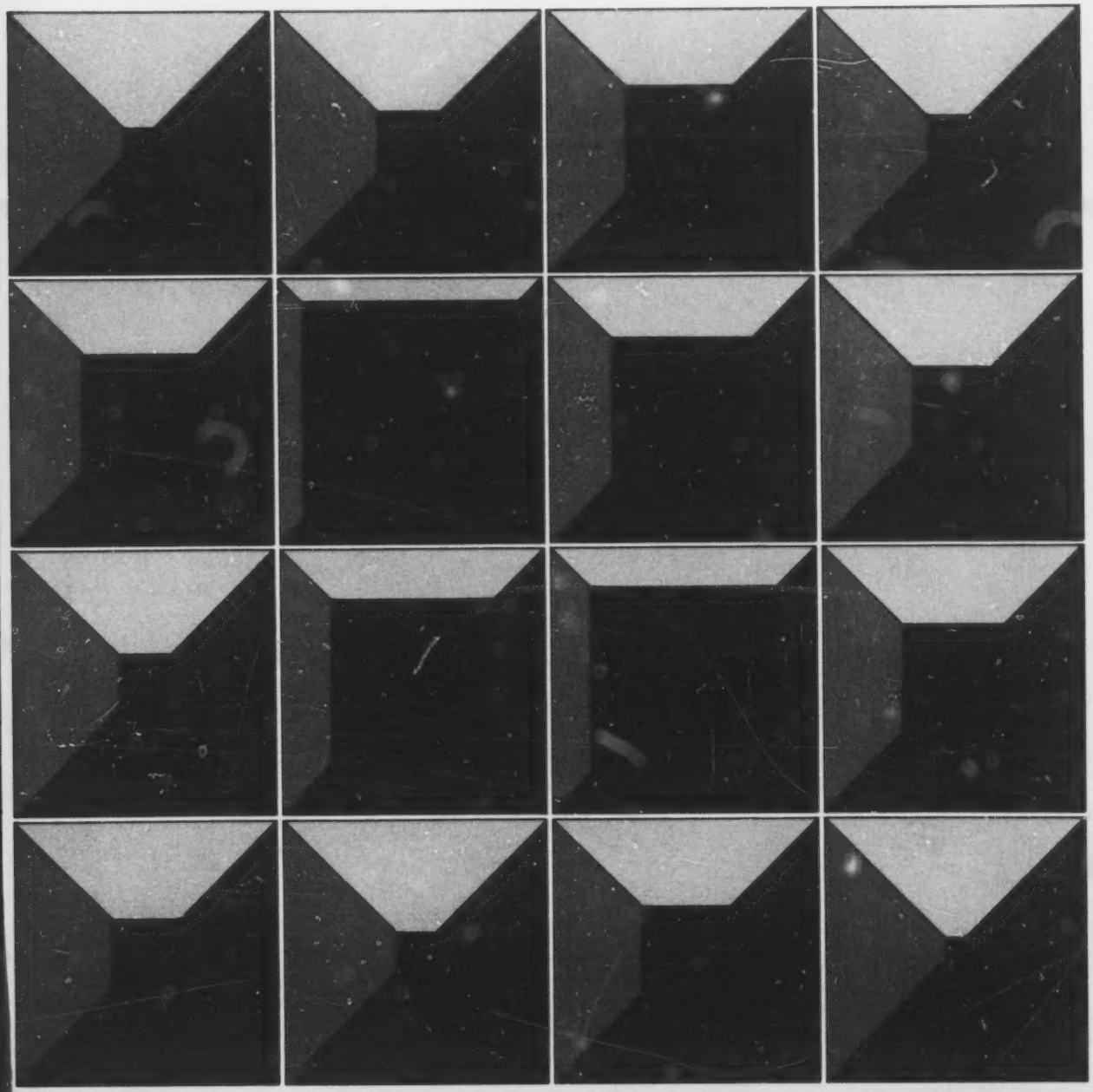
A Joint CBO-
NCEP Study

CETA Training Programs—
Do They Work for Adults?

July 1982

Congress of the United States
Congressional Budget Office

National Commission for Employment Policy



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CETA TRAINING PROGRAMS:
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and
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Employment Policy

PREFACE

The Congress is considering proposals to replace the Comprehensive Employment and Training Act (CETA), which expires at the end of fiscal year 1982. This paper, requested by the Senate Budget Committee, describes current CETA training programs and analyzes their effects on the post-program earnings of adult participants.

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In accordance with CBO's mandate to provide objective and impartial analysis, this paper contains no recommendations.

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SUMMARY

The Comprehensive Employment and Training Act (CETA), which authorizes most job training programs for low-income persons, is scheduled to expire at the end of fiscal year 1982. Several proposals for new legislation are now before the Congress.[1] Two important issues in the design and operation of job training programs are: whom to serve and what services to provide. To provide background information on these issues, this paper analyzes the effects of CETA training on participants' post-program earnings.

CETA TRAINING PROGRAMS

The federal government will spend about $1.7 billion in fiscal year 1982 to support CETA comprehensive job-training programs through Title II-B,C. These programs are administered by state and local governments and provide a variety of services including classroom training, on-the-job training, work experience, and job search and placement assistance. In fiscal year 1980 (the latest year for which complete data were available), approximately three-quarters of a million low-income persons were served by these training programs.

Almost half of the 1980 participants in CETA comprehensive training programs were enrolled in classroom training, which took place in institutional settings and was designed primarily to provide specific occupational skills such as typing and keypunching, as well as basic educational skills such as those required for a high-school equivalency degree (see Summary Table 1). Slightly more than a tenth of the participants were enrolled in on-the-job training, which took place in actual job settings and was designed primarily to provide specific occupational skills, such as automobile repair and machine tool operation. The remaining four-tenths of the 1980 participants were enrolled in work-experience

1. The Administration's proposal, the Job Training Act of 1982--S. 2184--was introduced in the Senate on March 9, 1982. The Senate passed the Training for Jobs Act--S. 2036--on July 1, 1982, and the House Committee on Education and Labor reported the Job Training Partnership Act--H.R. 5320--on May 17, 1982.

programs, which provided subsidized jobs that focused primarily on establishing basic work habits and attitudes. The typical work-experience position is difficult to characterize, however, because of variations in the degree of supervision and in the provision of supportive services.

Classroom training, on-the-job training, and work experience were generally short-term programs--lasting about 20 weeks, on average--and usually prepared participants for relatively low-wage, entry-level jobs. In 1980, the average cost for each participant served was $2,400, ranging from an average of $2,100 for on-the-job training to $2,700 for classroom training.

SUMMARY TABLE 1. DESCRIPTION OF CETA COMPREHENSIVE TRAINING PROGRAMS (TITLE II-B,C), FISCAL YEAR 1980

	All Training	Classroom Training	On-the-Job Training	Work Experience
Number of Participants Served[a]	760,000	360,000	100,000	300,000
Percent of Participants Served	100	47	13	40
Average Duration (in weeks)	20	21	19	20
Average Cost per Participant (in 1980 dollars)	2,400	2,700	2,100	2,200

SOURCE: Based on Department of Labor data.

a. Based on the average duration per participant.

THE EFFECT OF CETA TRAINING ON POST-PROGRAM EARNINGS OF ADULT PARTICIPANTS

Analysis of information on persons over 24 years old who entered a CETA program between January 1975 and June 1976 (the most recent group for which appropriate data were available) and a comparison group of low-income persons who were not in a CETA training program suggested the following:

- Training increased the average future earnings of female participants substantially--probably because CETA training programs increased hours worked more than wage rates and female participants had less past employment experience than male participants.

- Training did not seem to affect the average future earnings of male participants--probably because men had previously been employed more than women and there was little effect on their wage rates.

- In addition, both male and female participants with the least past employment experience had the largest earnings gains after training.

The Effect of Training for Women

For many years before training, female participants consistently earned less than female comparison group members (see Summary Figure 1). Immediately after training, however, participants' average earnings jumped above those of their comparison group and stayed above for at least three years (the longest period for which appropriate data were available).

Detailed analysis of this experience indicated that CETA training increased female participants' average post-program earnings by between $800 and $1,300 annually, with similar gains for the three major types of training (see Summary Table 2). Because only a small portion of this gain was due to increased wage rates, training may not have upgraded job skills substantially. Instead, its principal contribution was probably to improve job access and perhaps to encourage greater labor force participation. Although women seemed to benefit more from training than men, they still earned less after training--primarily from receiving lower wage rates rather than from working fewer hours.

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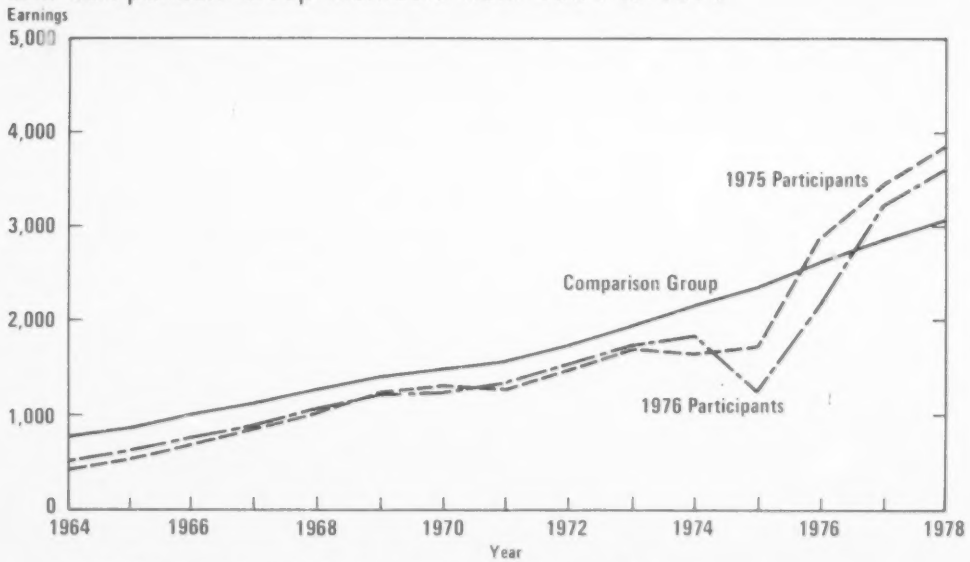
Summary Figure 1.

Average Annual Earnings for Female CETA Participants and Comparison Group Members from 1964 to 1978



SOURCE: Estimates from the Continuous Longitudinal Manpower Survey.

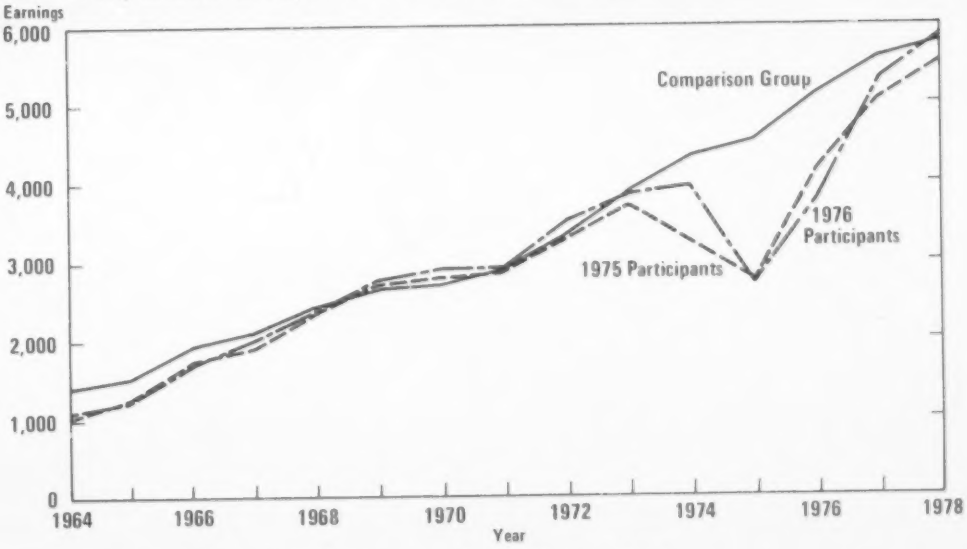
The Effect of Training for Men

For most of the period before training, male participants consistently earned about as much as did male comparison group members (see Summary Figure 2). In the year before they entered a training program, however, male participants experienced unusually low average earnings. Nevertheless, soon after leaving the program, their earnings returned to approximately the level attained by the comparison group.

Men in each of the three major types of training programs experienced this same pattern. The best information available indicates that male participants' earnings would have increased in this way even in the absence of training--that is, training had no discernible effect on the average post-program earnings of men (see Summary Table 2).

Summary Figure 2.

Average Annual Earnings for Male CETA Participants and Comparison Group Members from 1964 to 1978



SOURCE: Estimates from the Continuous Longitudinal Manpower Survey.

ISSUES AND OPTIONS FOR FUTURE JOB-TRAINING PROGRAMS

One important issue is whether there is a necessary federal role in providing job-training programs. Currently, the federal government provides support for programs administered by state or local governments. To the extent that such programs might receive funding from other sources, there would be no need for federal involvement. It seems unlikely, however, that other sources would replace reduced federal funding for such programs.

Given a federal role, two important issues arise in the design of such programs:

- What employment problems are facing low-income persons?
- What types of job-training programs are most effective for this group?

SUMMARY TABLE 2. THE EFFECT OF CETA TRAINING ON AVERAGE ANNUAL POST-PROGRAM EARNINGS BY SEX AND TYPE OF TRAINING (In 1980 dollars)[a]

Type of Training	For Women[b]	For Men[c]
All CETA Training	800-1,300	Insignificant
Classroom training	800-1,400	Insignificant
On-the-job training	700-1,100	Insignificant
Work experience	800-1,300	Insignificant

SOURCE: Estimates from the Continuous Longitudinal Manpower Survey and the March 1976 Current Population Survey supplemented by individual Social Security earnings records.

a. For persons over 24 years old and in CETA training programs more than seven days.

b. Results are statistically significant at the 0.01 level. This indicates a less than one-in-one hundred chance that a result of this magnitude could have happened randomly.

c. Specific estimates were $200 for all men in CETA training programs and $300, $300, and -$100 for men in classroom training, on-the-job training, and work experience, respectively. None of these estimates was statistically significant at the 0.05 level.

In addition, no matter how federal legislation resolves these issues, state or local program operators will continue to make decisions about whom to serve and what services to provide.

Two specific aspects of bills that are currently being considered as replacements for the Comprehensive Employment and Training Act (CETA) relate to the above issues--the eligibility

criteria for determining which adults should participate in training programs, and the types of training services that would be available.

What Are the Employment Problems Facing Low-Income Persons?

Low-income persons may experience different types of employment problems. Persons who have never worked or who have not worked for a long time may face problems in entering or reentering the job market. Persons with chronically low earnings, on the other hand, may need to be more stably employed and to increase their wage rates. Women are more likely to be members of the former group, whereas men are more likely to be members of the latter group.

Currently, CETA eligibility criteria do not distinguish between low-income persons with little previous employment experience and those with chronically low earnings. Although none of the proposals currently pending before the Congress would explicitly distinguish between these groups, both the Administration's proposal and the Senate-passed bill would focus training programs more on persons in families receiving Aid to Families with Dependent Children--that is, probably more on women who are more likely to have limited job experience. The House Committee bill, on the other hand, would essentially continue the current eligibility criteria.

What Types of Training Are Most Effective?

The types of training that are most effective at addressing the employment problems facing low-income persons differ for persons with little previous employment experience and persons with some previous employment experience but chronically low earnings.

Persons with Little Job Experience. CETA training programs seemed to be effective for persons with limited previous employment experience, as seen in the greater overall earnings gains for women. Whether current training was provided in a classroom setting, on the job, or through subsidized work experience appeared to make little difference in participants' average post-program earnings. For all three types of training, the discounted value of participants' increased earnings during the next several years approximately equaled the federal costs of training.

Since most of the earnings gain from CETA training programs was due to an increase in the amount of time worked, more emphasis on job placement services and less on training might achieve the same results at a lower cost per participant. This would be true, however, only if the effect of CETA programs was due primarily to placement services rather than training. Otherwise, focusing mostly on placement services might seriously limit potential future earnings growth.

Previously Employed Persons with Chronically Low Earnings. None of the current types of training seemed to help persons with more previous employment experience but chronically low earnings--more often men than women. For this group, there is a smaller margin for increasing the amount of time worked; this means that greater emphasis must be placed on raising their wage rates, which would require more extensive, and thus more costly, training. The magnitude of the potential benefits of extensive training for this group is uncertain; however, some findings of a CETA demonstration project, the Skill Training Improvement Program, that provided training for more highly skilled jobs, suggest the possibility of positive results.

Current Legislation. All bills currently being considered would change the types of services allowed, although in varying degrees. Currently, CETA programs provide many services, including classroom training, on-the-job training, work experience, and job placement assistance. The Administration's proposal and the Senate bill would eliminate work experience for adults, whereas the House Committee bill would retain work experience. In addition, all bills would allow, but not require, more extensive training.

CHAPTER I. INTRODUCTION

The Congress and the Administration are considering legislation that will determine the future of federal job-training programs. These programs were originated in 1962 under the Manpower Development and Training Act (MDTA), reformulated in 1973 by the Comprehensive Employment and Training Act (CETA), and further modified by amendments to CETA in 1978. Because CETA expires at the end of fiscal year 1982, new legislation is required if the federal government is to fund such programs in the future.

For this purpose, the Administration proposed the Job Training Act of 1982--S. 2184, which was introduced in the Senate on March 9, 1982. In addition, the House Committee on Education and Labor reported the Job Training Partnership Act--H.R. 5320--on May 17, 1982, and the Senate passed the Training for Jobs Act--S. 2036--on July 1, 1982.

Among the important issues in the design and operation of any job-training program are:

- Who should be served?
- What services should be provided?
- Who should provide these services? and
- How should these services be funded?

This paper addresses the first two issues by analyzing the effects of training programs--not including public service employment--on disadvantaged, low-income adults. Chapter II describes the training programs funded under CETA. Chapter III examines the effect of these programs on the post-program earnings of adult participants. Chapter IV analyzes issues and options in the design of future job-training programs.

CHAPTER II. CETA TRAINING

This chapter describes training programs authorized by the Comprehensive Employment and Training Act (CETA). It examines the program structure, the types of training, and the types of participants.

PROGRAM STRUCTURE AND FUNDING

The federal government provides funding for CETA training programs, primarily for economically disadvantaged persons. Forty percent of total CETA funding is currently provided through comprehensive training programs (Title II-B,C). The remaining funding is provided through three categorical programs--special federal responsibilities (Title III), youth programs (Title IV), and private sector opportunities (Title VII).[1]

Although federally funded, most CETA programs are administered locally. Local program operators--referred to as prime sponsors --decide whom to serve and what types of training to provide within federally established guidelines. Discretion is greatest in Title II-B,C comprehensive training programs.

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1. CETA programs have been changed many times since they were enacted in December 1973. The original act included: Title I comprehensive manpower services, Title II public employment, Title III special federal responsibilities, and Title IV Job Corps. Amendments in December 1974 added Title VI emergency jobs. In August 1977, several youth programs under Titles III-C and VIII were added. In October 1978, CETA was reauthorized to include Title II-B,C comprehensive training programs, Title II-D transitional employment opportunities, Title III special federal responsibilities, Title IV youth programs, Title VI countercyclical public service employment, Title VII private sector opportunities, and Title VIII Young Adult Conservation Corps. In August 1981, the Omnibus Reconciliation Act removed the authorization for Titles II-D, VI, and VIII.

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In fiscal year 1982, 475 prime sponsors--including 76 cities, 202 counties, 139 consortia, and 58 other jurisdictions--administered CETA programs.[2] Prime sponsors may choose to organize themselves in many different ways. For instance, they may operate programs themselves; contract with outside organizations; or provide training programs through smaller governmental units.

Spending for CETA comprehensive training programs kept pace with inflation between fiscal years 1975 and 1981--growing from $1.3 billion to $2.2 billion (see Table 1). Last year's budget actions, however, will cut back 1982 spending substantially, to approximately $1.7 billion. At the same time, due largely to changes in public service employment, total CETA spending grew from $2.9 billion in 1975 to a peak of $9.5 billion in 1978, and will fall to about $4.4 billion in 1982. As a result of these changes, comprehensive training programs currently represent a share of total CETA funding similar to their share in 1975.

TYPES OF TRAINING AND TYPES OF PARTICIPANTS

CETA comprehensive training programs provide three main types of training--classroom, on-the-job, and work experience--as well as allowances for participants while being trained and job-related services such as counseling and placement activities.[3] These programs, which are described in this section, offer basic educational training, specific occupational training, general exposure to work, and job search assistance.

Participants in CETA training programs are members of low-income families. The median family income for adults (persons over 24 years old) entering training in 1980 was $5,000. Of these participants, one-third received public assistance during the year before training (see Table 2).

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2. Prime sponsors are generally state or local governments with populations of 100,000 or more. The number of prime sponsors has increased from 403 in 1975 to 475 in 1982. The distribution of prime sponsors by type of government has not changed substantially, however.

3. This section focuses on the national picture and may therefore not apply to particular prime sponsors.

TABLE 1. SPENDING FOR COMPREHENSIVE EMPLOYMENT AND TRAINING ACT PROGRAMS, FISCAL YEARS 1975-1982 (In millions of dollars)

	1975	1978	1981	1982
Comprehensive Training Programs[a]/	1,331	1,992	2,231	1,700
Public Service Employment Programs[b]/	838	5,764	2,387	274
Other Programs[c]/	751	1,777	3,082	2,428
Total	2,920	9,533	7,700	4,402

SOURCE: Figures for 1975, 1978, and 1981 represent actual spending, from Department of Labor data. Figures for 1982 are CBO estimates.

a. Includes Title I/II-B,C.

b. Includes Titles II/II-D and VI.

c. Includes Titles III, IV, VII and VIII.

In 1980, most participants received classroom training or work experience rather than on-the-job training, and the types of people receiving different types of training varied somewhat (see Table 2).[4] For example, on-the-job training participants were more likely than other participants to be male and were more

4. Although the overall CETA program has varied since it began, the comprehensive training portion, on average, does not seem to have changed substantially. The duration of training has remained fairly constant. Training costs per participant have increased by only up to 20 percent in real terms (between 1976 and 1980) and the characteristics of participants have remained roughly the same. Because of this stability, results (Continued)

TABLE 2. CHARACTERISTICS OF NEW ADULT PARTICIPANTS IN CETA COMPREHENSIVE TRAINING PROGRAMS (TITLE II-B,C), FISCAL YEAR 1980[a]/

Characteristics	All Training	Classroom Training	On-the-Job Training	Work Experience
Percent Male	43.7	38.6	62.1	43.6
Percent Minority[b]/	48.7	50.5	38.5	41.3
Percent with Less Than 12 Years of Education	36.6	35.1	35.5	41.0
Percent Over 44 Years Old	15.3	12.5	13.1	23.2
Average Percent of Time in the Labor Force [c]/	68	66	74	69
Percent in Families Receiving Public Assistance [c]/	32.7	35.9	23.1	31.6
Median Family Income [c]/ (in 1980 dollars)	5,000	4,900	5,700	4,900

SOURCE: Continuous Longitudinal Manpower Survey.

a. Includes persons over 24 years of age.

b. Includes all non-white persons and Hispanics.

c. During the year before entering a CETA program.

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4. (Continued)
of the analysis of program effectiveness based on data for persons who entered a CETA program between January 1975 and June 1976 are probably indicative of the relative effectiveness of current programs.

likely, on average, to have spent more time in the labor force during the year before training began. The occupations for which training was provided also varied: for example, in 1976--the most recent year for which these data were available--classroom training participants were more likely to receive clerical training than other participants (see Table 3). In spite of these differences, however, in 1980 the average duration of all three types of training was quite similar and costs, especially for on-the-job training and work experience, were also similar (see Table 4).

Classroom Training

Classroom training provides occupational skill training and basic educational training in an institutional setting. Occupational training--provided to about three-quarters of classroom training participants in 1980--provides skills for specific jobs, such as clerical workers. Basic educational training--provided

TABLE 3. DISTRIBUTION OF PARTICIPANTS BY OCCUPATION FOR WHICH TRAINING WAS PROVIDED, FISCAL YEAR 1976[a]/ (In percents)

Occupation for Which Training Was Provided	Classroom Training	On-the-Job Training	Work Experience
Clerical	39	15	24
Crafts	19	21	7
Operative (nontransport)	15	28	9
Laborers	1	8	16
Service	17	11	26
Other	9	17	18
Total	100	100	100

SOURCE: Westat, Inc., Continuous Longitudinal Manpower Survey Follow-up Report No. 2 (March 1979).

a. Includes persons who entered a CETA program during fiscal year 1976 and terminated within 18 months. Includes only persons who reported an occupation for which training was provided.

TABLE 4. DESCRIPTION OF CETA COMPREHENSIVE TRAINING PROGRAMS (TITLE II-B,C), FISCAL YEAR 1980

	All Training	Classroom Training	On-the-Job Training	Work Experience
Number of Participants Served[a]	757,000	356,000	97,000	304,000
Percent of Participants Served	100	47	13	40
Average Duration (in weeks)	20	21	19	20
Average Cost per Participant (in 1980 dollars)	2,400	2,700	2,100	2,200

SOURCE: Based on Department of Labor data.

a. Based on the average duration per participant.

to about one-quarter of classroom participants in 1980--focuses on general skills, for example, preparation for high school equivalency degrees or training in English as a second language, rather than skills for specific jobs.

Classroom training is provided in many different settings. For example, CETA participants may enroll with other students in courses offered by state and local vocational education institutions. Or they may enroll in these institutions for an evening class specifically for CETA participants. Or thirdly, they may participate in a full-time CETA program at a multipurpose skills center.

Classroom training focuses most heavily on clerical skills, probably because these skills can be taught easily in a classroom setting. In 1976, 39 percent of occupational classroom training was for clerical jobs; 19 percent was for craft jobs; 15 percent was for nontransport operative jobs; and 17 percent was for service jobs.

Forty-seven percent of all training program participants were enrolled in classroom training, at a cost of $2,700 per participant, in 1980. On average, these participants received 21 weeks of training. Unfortunately, data are not available to describe the average number of hours in training per week or the proportion of participants who completed training.

On-the-Job Training

On-the-job training provides specific occupational skill training in actual job settings. CETA subsidizes participating employers for part of the wages of untrained persons and generally expects these persons to continue working for the firm or organization that trained them.

On-the-job training focuses most heavily on operative and craft training, probably because these skills may be best learned in a workplace setting. In 1976, 28 percent of the participants in on-the-job training were trained for operative jobs; 21 percent were trained for craft jobs; 15 percent were trained for clerical jobs; and 11 percent were trained for service occupations.

On-the-job training is the least frequently used type of training--representing 13 percent of participants in 1980--probably because it requires existing jobs. In addition, since private employers generally prefer job-ready workers, more experienced persons tend to be selected for these positions. On-the-job training provided an average of 19 weeks of training, costing $2,100 per participant served in 1980.

Work Experience

Work experience differs from classroom training and on-the-job training because it focuses more heavily on providing subsidized employment to instill basic work habits and attitudes rather than to teach specific job skills. Work-experience jobs are in settings with varying degrees of supervision, complementary training, and supportive services.

Forty percent of all participants were enrolled in work-experience programs in public or nonprofit organizations in 1980. Work experience was most frequently in clerical or service jobs in 1976--24 percent of participants in work experience received clerical training and 26 percent training for service jobs. Work-experience participants received, on average, 20 weeks of training at a cost of $2,200 per person in 1980.

CHAPTER III. THE EFFECTS OF CETA TRAINING ON THE POST-PROGRAM EARNINGS OF ADULT PARTICIPANTS

This chapter examines the effect of CETA classroom training, on-the-job training, and work experience on the post-program earnings of adult participants.[1] The first section describes the basic methodology used, the second reports the findings obtained, and the third briefly interprets these findings.

ESTIMATING THE EFFECT OF TRAINING

The effect of training was estimated as the average difference between participants' earnings during their first two to three years after leaving the program, and the best available estimates of what they would have earned if training had not been provided (see Appendix A). Although these estimates are only approximations, they probably provide a reasonable indication of the effect of CETA training.

Earnings Before and After Training

Figures 1 through 6 describe the average annual earnings of two groups of CETA participants, before and after training, as well as the corresponding earnings of a comparison group of similar persons who were not in a CETA program.

Figure 1 illustrates that, before training, the long-term earnings profile of female participants was slightly below that of female comparison group members. Immediately after training, however, the average earnings of female participants jumped sharply above that of the comparison group and remained there for at least two to three years (the period for which data were available).

1. Youth were not included because earnings in the years after participating in training--the performance indicator used for adults--is not always the most appropriate performance indicator for youth. For a discussion of youth training programs see Congressional Budget Office, Improving Youth Employment Prospects: Issues And Options (February 1982).

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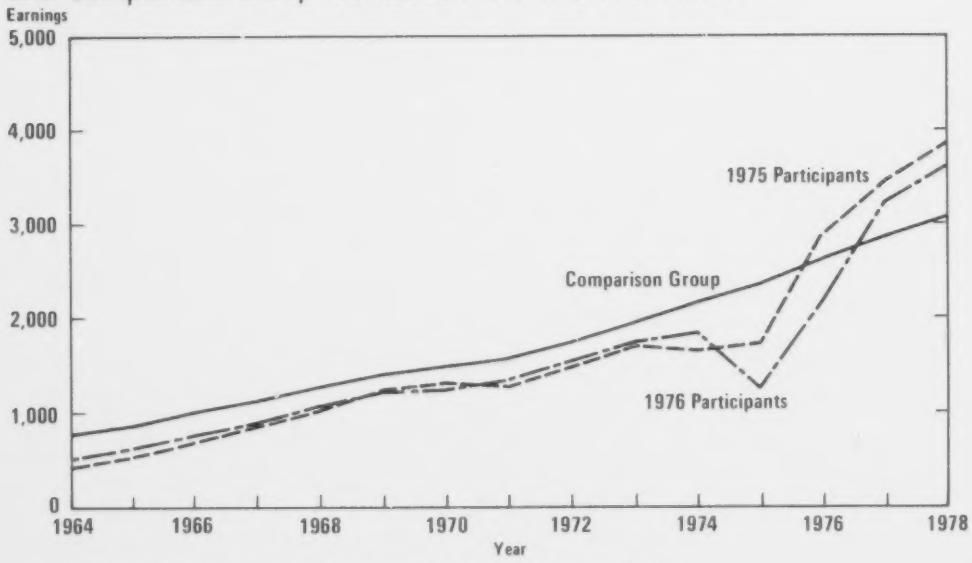
Figure 1.
Average Annual Earnings for Female CETA Participants and Comparison Group Members from 1964 to 1978



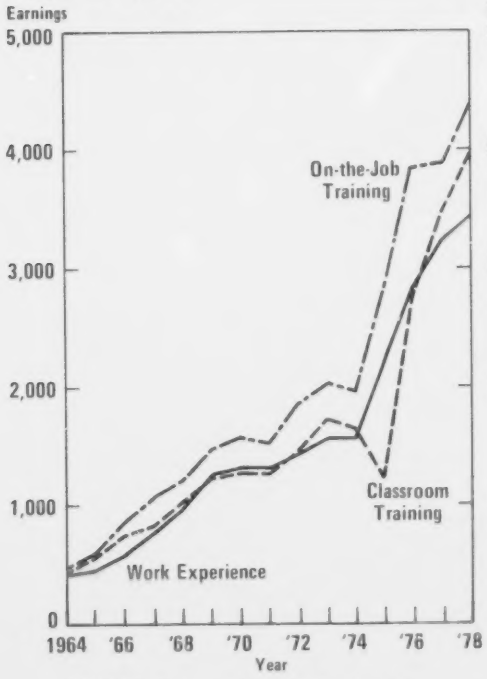
SOURCE: Estimates from the Continuous Longitudinal Manpower Survey.

This pattern was experienced both by women who entered training in 1975 and by women who entered training in 1976 (the two groups for which data were available).[2] In addition, it was experienced to a similar degree by female participants in classroom training, on-the-job training, and work experience (see Figures 2 and 3).

The pattern experienced by male participants was entirely different, however (see Figures 4, 5, and 6). Their average, long-term earnings profile before entering CETA was virtually the

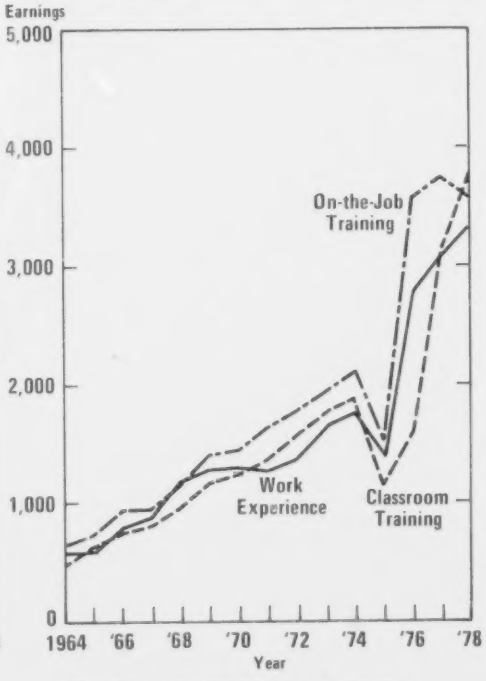
2. For reasons explained in Appendix A, 1975 participants were defined as persons who began CETA training between January and August 1975 whereas 1976 participants were defined as those who began training between September 1975 and June 1976.

Figure 2.
1975 Female CETA Participants' Average Annual Earnings from 1964 to 1978



SOURCE: Estimates from the Continuous Longitudinal Manpower Survey.

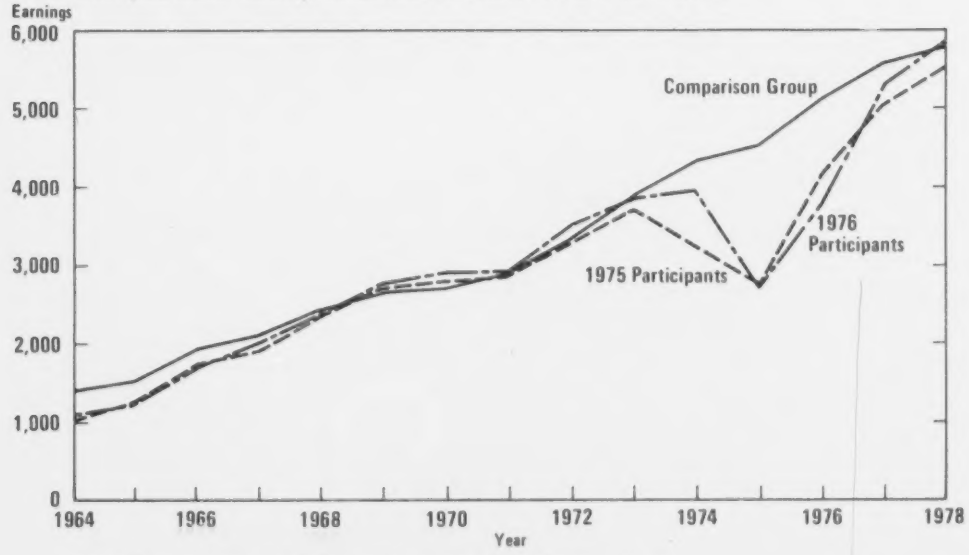
Figure 3.
1976 Female CETA Participants' Average Annual Earnings from 1964 to 1978



SOURCE: Estimates from the Continuous Longitudinal Manpower Survey.

same as that of male comparison group members. But the year before entering the program, male participants experienced a sharp drop in earnings. Nevertheless, soon after leaving the program, their earnings had returned approximately to the same level as that of the comparison group. The best available data indicate that the earnings decline experienced by male participants (and to a lesser extent also by female participants) was temporary and would have disappeared rapidly, even in the absence of training (see Appendix B). For reasons explained in Appendix B, this "pre-program dip" was probably a statistical artifact produced by

Figure 4.
Average Annual Earnings for Male CETA Participants and Comparison Group Members from 1964 to 1978



SOURCE: Estimates from the Continuous Longitudinal Manpower Survey.

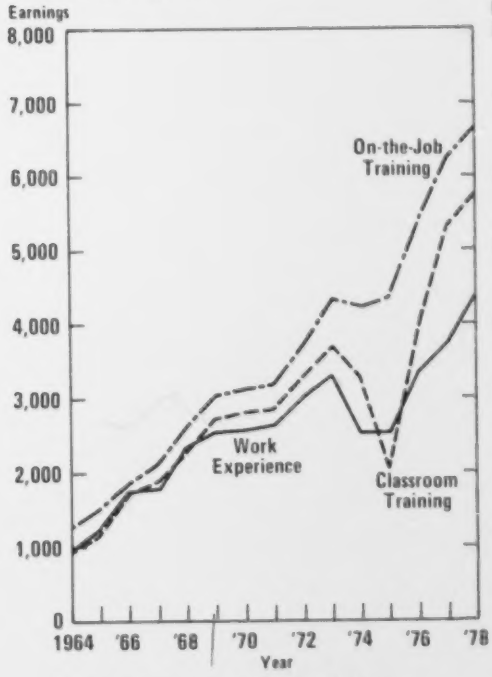
the fact that eligibility for CETA training programs is based on short-term rather than long-term individual earnings experience.

The Analysis

The analysis was conducted as follows. First, what each participant in the sample would have earned if training had not been provided was predicted from his or her past earnings trend. Figure 7 illustrates this process for a participant whose earnings increased sharply after CETA training.

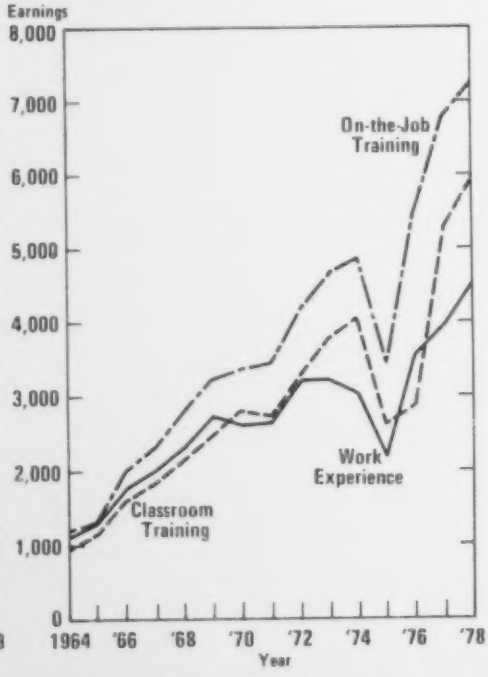
Next, the difference between each participant's actual and predicted earnings was computed for up to three years after training (see A, B, and C in Figure 7). This difference--referred to hereafter as the deviation from trend--was averaged for all

Figure 5.
1975 Male CETA Participants' Average Annual Earnings from 1964 to 1978



SOURCE: Estimates from the Continuous Longitudinal Manpower Survey.

Figure 6.
1976 Male CETA Participants' Average Annual Earnings from 1964 to 1978



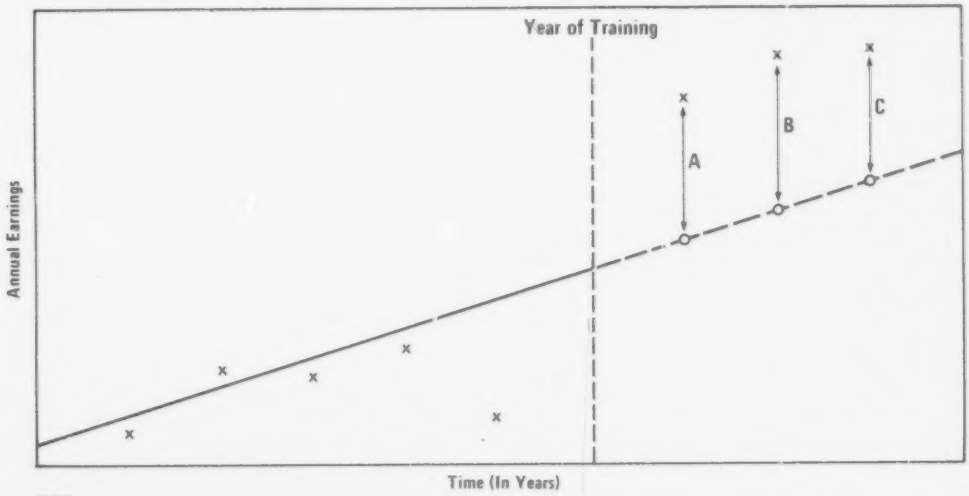
SOURCE: Estimates from the Continuous Longitudinal Manpower Survey.

years after training for each group of participants, providing a rough indication of the effect of training.

The next step was to account for changes in participants' earnings that resulted from fluctuating economic conditions. These changes were estimated by observing corresponding deviations from the earnings trends of comparison group members. The average deviation from trend for the comparison group was then subtracted from the average for participants to refine the initial estimate of the effect of training. Because each person's deviation was measured from his or her own past trend, it was not necessary for

Figure 7.

Earnings After Training Relative to the Past Long-Term Earnings Trend of a CETA Participant Who Experienced a Post-Program Earnings Gain



KEY:
x = Actual annual earnings
O = Predicted annual earnings without training
A, B, and C = Difference between actual and predicted earnings

the trends of participants and comparison group members to be the same, although Figures 1 and 4 indicate that they were quite similar on average.

The principal strength of the preceding approach is the ability of past earnings trends to account for individual differences in factors that affect future earnings. Past trends reflect measurable factors that affect earnings, such as age and education, plus factors that cannot be measured directly, such as motivation. The approach is, however, only as strong as the relationship between past and future earnings.

Three further refinements were made. First, adjustments were made to account for the unusually low average earnings experienced by participants (especially men) in the year before they entered training. Second, all results were expressed in 1980 dollars to account for inflation. And third, adjustments were made to

account directly for individual differences in personal characteristics such as age, education, marital status, and family composition. To the extent that these characteristics predict likely future deviations from past earnings trends, it was necessary to control for them explicitly. Doing so had a relatively small effect on the final results, however.

The Data

The analysis was based on data for CETA participants who were over 24 years old, who entered classroom training, on-the-job training, or work experience between January 1975 and June 1976, and who stayed in the program for more than seven days.[3] These data were obtained for a sample of 1,615 female participants and 1,608 male participants from the Continuous Longitudinal Manpower Survey conducted by Westat, Inc., and the U.S. Bureau of the Census for the Employment and Training Administration of the U.S. Department of Labor.[4] This large-scale national follow-up survey of CETA participants provides detailed information about the employment experience of participants before and after training, plus data on their personal characteristics.[5] In addition, annual

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3. Persons over 24 years old were chosen in order to focus on adults with meaningful past earnings experience. Participants in public service employment were excluded to focus directly on CETA's comprehensive training title. Persons entering between January 1975 and June 1976 were chosen because they were the only groups for whom appropriate data were available. And persons staying in the program for more than seven days were selected to ensure a minimum exposure to training and to be consistent with the criterion used by other researchers. Changing this last criterion to 50 days did not alter the results, however.

4. For a description of the Continuous Longitudinal Manpower Survey see Westat, Inc., Impact on 1977 Earnings of New FY 1976 CETA Enrollees in Selected Program Activities, Employment and Training Administration, U.S. Department of Labor (1980).

5. This information was obtained from CETA application forms plus surveys administered to participants when they entered CETA training programs and approximately 6, 18, and 36 months later.

earnings data for many years before training and up to three years after training were obtained from the Social Security records of each participant and included as part of the data base.[6]

Data for the comparison group of 21,096 women and 9,572 men were obtained from the March 1976 Current Population Survey supplemented by individual Social Security earnings records. Only persons who were between 25 and 60 years old, who earned less than the Social Security maximum for every year from 1970 through 1975, and who were members of families with 1975 incomes less than $30,000 were included in the analysis.[7]

OVERALL FINDINGS

Because CETA training affected men and women differently, these effects are reported separately. All results are in 1980 dollars and are rounded to the nearest $100. In brief:

For Women:

- CETA increased average post-program earnings by $800 to $1,300 a year (see Table 5). About four-fifths of this increase was due to an increase in the amount of time worked and about one-fifth was due to increased wage rates.

- In addition: the effects of classroom training, on-the-job training, and work experience were roughly the same; participants with the least previous labor market experience increased their earnings the most; the effect of training did not diminish during the first two to three years after training; and the effect of training appeared

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6. For a discussion of this process see Westat, Inc. (1980).

7. The maximum earnings covered by Social Security and thus reported by Social Security records were $7,800, $7,800, $9,000, $10,800, $13,200, and $14,100 from 1970 through 1975, respectively. Persons in families with incomes greater than $30,000 were eliminated to be consistent with the analysis by Westat, Inc., who supervised development of the data base. See Westat, Inc., Continuous Longitudinal Manpower Survey: The Impact of CETA on Participant Earnings, Working Paper # 2, U.S. Department of Labor (June 1980), p. 2-6.

TABLE 5. THE EFFECT OF CETA TRAINING ON AVERAGE ANNUAL POST-PROGRAM EARNINGS BY SEX AND TYPE OF TRAINING (In 1980 dollars)[a]/

Type of Training	Women[b]/	Men
All CETA Training	800 - 1,300[c]/	200[d]/
Classroom training	800 - 1,400[c]/	300[d]/
On-the-job training	700 - 1,100[c]/	300[d]/
Work experience	800 - 1,300[c]/	-100[d]/

SOURCE: Estimates were derived from the Continuous Longitudinal Manpower Survey and the March 1976 Current Population Survey supplemented by individual Social Security earnings records.

a. For persons over 24 years old and in CETA training more than seven days.

b. The upper bound of each range includes earnings gains due to increased labor force participation, increased ability to find and hold a job, increased hours worked per week employed, and increased wage rates. The lower bound excludes earnings gains due to increased labor force participation and increased hours worked per week employed.

c. Significant at the 0.01 level.

d. Not significant at the 0.05 level.

to increase with the length of training (although this last finding may simply reflect the fact that women with the greatest potential were least likely to drop out of the program).

For Men:

- CETA training did not appear to affect average post-program earnings, although for two subgroups there was

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some evidence of an effect. This evidence was subject to qualifications, however.

The Effect of CETA Training for Women

Average Post-Program Earnings Gains. Women in classroom training increased their average post-program earnings by about $1,400 a year, women in work experience programs increased their average post-program earnings by about $1,300 a year, and women in on-the-job training increased their average post-program earnings by about $1,100 a year. These large gains were significant according to accepted statistical standards[8] and were consistent with the findings of past studies based on similar data.[9] They represent the upper limit of the range of results for women in Table 5.

The small differences in the results for the different types of training were not statistically significant and thus do not necessarily indicate true differences in effectiveness. Therefore, it appears that all three types of training had roughly the same effect.

This finding is contrary to that of several other researchers who concluded that on-the-job training was most effective. But for reasons discussed in Appendix E, the statistical model used by these researchers did not fully compensate for the fact that on-the-job training participants earned substantially more than the other participants did before they entered training.

Changes in the Components of Earnings. The average earnings gain experienced by female participants was due to changes in:

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8. Statistical significance indicates that a finding is unlikely to reflect a chance sampling error. All statements in the text about statistical significance are based on the conventional 0.05 level, unless otherwise indicated.

9. See Orley Ashenfelter, "Estimating the Effect of Training Programs on Earnings," The Review of Economics and Statistics, vol. LX, no. 1 (February 1978), pp. 47-57. Also see Nicholas M. Kiefer, "The Economic Benefits from Four Government Training Programs," in F.E. Bloch, ed., Research in Labor Economics: Evaluating Manpower Training Programs, (JAI Press, 1979), pp. 159-86.

- their labor force participation (the amount of time they were available for employment);

- their ability to find and hold a job (measured by the amount of time they were employed as a proportion of the amount of time they were available for employment);

- the number of hours they worked per week employed (reflecting their mix of part-time, full-time, and overtime employment); and

- their average hourly wage rate.

To further refine estimates of the effect of training for female participants, it was necessary to examine the role played by each of these basic components of earnings.

Table 6 describes each component during the year before and the first year after CETA training. According to calculations based on this information (see Appendix F), 21 percent of the average earnings gain for female CETA participants was due to increased labor force participation; 39 percent was due to an increased ability to find and hold a job; and 18 percent was due to an increase in hours worked per week employed. Thus a total of 78 percent was due to factors relating to an increase in the amount of time employed. The remaining 22 percent was due to increased wage rates.[10]

To interpret these results for women, one must examine the role of each earnings component. For example, consider labor force participation. Labor force participation's contribution to post-program earnings gains represents an increase beyond that predicted by participants' past experience, by the experience of comparison group members, and by individual personal characteristics. To the extent that training produced this unusually large increase (for example, by instilling self-confidence in women entering the labor force for the first time or reentering after a long absence), earnings gains due to increased labor force participation should be attributed to training. But to the extent that this increase represents a self-selection process whereby women already predisposed to entering the labor market were more

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10. These percentages are only approximations and are subject to qualifications discussed in Appendix F.

TABLE 6. LABOR FORCE PARTICIPATION, EMPLOYMENT, HOURS WORKED, AND WAGE RATES BEFORE AND AFTER CETA TRAINING [a]

	Women		Men	
	Year Before Training	Year After Training	Year Before Training	Year After Training
Average Number of Weeks in the Labor Force	35	41	43	46
Average Time Employed as a Proportion of Average Time in the Labor Force	0.47	0.62	0.57	0.63
Average Number of Hours Worked per Week Employed	33	38	35	40
Average Hourly Wage Rate for Time Employed (in 1980 dollars)	3.81	4.49	5.41	5.93

SOURCE: Estimates were derived from the Continuous Longitudinal Manpower Survey.

a. For persons over 24 years old and in CETA training more than seven days.

likely to participate in CETA, its contribution to future earnings gains should not be attributed to training.

Next, consider participants' ability to find and hold a job. This component's contribution to post-program earnings gains represents an unusually large improvement in participants' success in the job market. Such an improvement was unlikely without training.

The third component of earnings, hours worked per week employed, reflects participants' mix of part-time, full-time, and overtime employment. To some extent, an increase in this factor

could have been produced by female participants' decisions to shift from part-time to full-time employment. But much of this shift may have required assistance in preparation for and finding full-time employment.

The fourth component of earnings was wage rates, which largely reflects individual skill levels. Its contribution to earnings gains represents an increase in wage rates beyond that normally expected. Such an increase was unlikely to occur without the assistance of training.[11]

More Conservative Estimates of the Effect of Training. The preceding discussion indicates that even though the estimates of post-program earnings gains discussed above accounted for the past experience of participants, the past and post-program experience of comparison group members, and differences in personal characteristics, they may overstate the effect of CETA training for female participants. More conservative estimates were obtained by eliminating the portion (roughly two-fifths) due to shifts in the two components that probably could have been most easily changed by female participants, even without special assistance--labor force participation and hours worked per week employed. These estimates, which may understate the effect of training, indicate that all three types of CETA training increased the average post-program earnings of female participants substantially (see the lower bound of the ranges in Table 5).

Duration of the Effect of Training. A comparison of earnings gains for each of the first three years after female participants had left training yielded no sign of decay over time. In addition, past studies based on similar data indicated that the effect of training for women persisted for at least three to five years (the maximum period for which data were available).[12]

The Effect of CETA Training for Men

None of the three types of CETA training appeared to affect the average post-program future earnings of male participants (see Table 5). After experiencing a sharp earnings drop in the year

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11. Some of the increase in wage rates may, however, have been due to shifts from part-time to full-time employment, some portion of which might have occurred without training.

12. See Ashenfelter, op. cit., and Kiefer, op. cit.

before training, male participants returned to their past trend after they left the program. According to the best information available, this would have occurred without training (see Appendix B).

This finding does not mean that CETA training had no effect on the future earnings of male participants. A small effect could have been missed by the analysis because of the range of uncertainty (several hundred dollars) produced by inevitable limitations in the data. Nevertheless, the findings suggest that training probably did not have a large effect for male participants.

Secondly, the finding does not imply that no training programs were effective for any groups of male participants. Some local programs might have been quite effective, but there was no way to identify these programs given the available data. In addition, some of the evidence below, although subject to qualifications, suggests that some subgroups of male participants may have increased their future earnings because of CETA training.

COMPARING RESULTS FOR MEN AND WOMEN

Women probably benefited most from CETA because they had the greatest margin for increased employment--the component of earnings that appeared to be most responsive to training. But even so, they did not earn as much on average as male participants did after they left the program.

Why Women Benefited More Than Men Did

Differences in past labor market experience rather than differences in personal characteristics probably explain why women benefited more than men did from CETA training. For example, the average ages, the average education, and the percentages of minority group members were roughly the same for male and female participants (see Table 7). But their past labor market experiences were quite different (see Tables 6 and 8).

Women were in the labor force for 35 weeks, on average, during the year before they began CETA training, and were employed for 47 percent of the time they were in the labor force (see Table 6). Men, on the other hand, were in the labor force for 43 weeks, on average, during the year before they began training and were employed for 57 percent of this time.

TABLE 7. CETA PARTICIPANT AGE, EDUCATION, AND MINORITY STATUS[a]/

	Average Age At Entry	Average Years of Schooling Completed At Entry	Percent Minority[b]/
Male Participants	34	11.0	42
In classroom training	33	11.1	52
In on-the-job training	33	11.3	32
In work experience	36	10.8	38
Female Participants	35	11.1	47
In classroom training	34	10.9	54
In on-the-job training	35	11.4	41
In work experience	37	11.5	36

SOURCE: Estimates were derived from the Continuous Longitudinal Manpower Survey.

a. For persons over 24 years old and in CETA training for more than seven days.

b. Minority participants include non-whites and Hispanics.

Furthermore, a much greater proportion of female participants had no employment experience before they entered training (see Table 8). Twelve percent of the female participants were never employed during the four- to five-year period before they entered training, whereas only 4 percent of the male participants were in this category.

Table 8 indicates that regardles of sex, earnings gains after training were much larger for persons with no previous employment experience than they were for persons with some previous experience. Female participants with no past employment had a $2,500

TABLE 8. EARNINGS GAINS BY SEX AND PREVIOUS EMPLOYMENT EXPERIENCE[a]/

Group	Number of Participants	Percent of Sample by Sex	Average Earnings Gain
Female Participants	1,615	100	1,300[c]/
Not previously employed[b]/	190	12	2,500[c]/
Previously employed	1,425	88	1,200[c]/
Male Participants	1,608	100	200[d]/
Not previously employed[b]/	66	4	4,500[c]/
Previously employed	1,542	96	100[d]/

SOURCE: Estimates were derived from the Continuous Longitudinal Manpower Survey and the March 1976 Current Population Survey supplemented by individual Social Security earnings records.

a. For participants over 24 years old and in CETA training programs for more than seven days.

b. Persons with no earnings reported to the Social Security Administration between 1970 and entry into a CETA program.

c. Significant at the 0.01 level.

d. Not significant at the 0.05 level.

average earnings gain, while those with some previous employment had a $1,200 gain. Corresponding results for men were $4,500 and $100.[13]

Given the fact that women had far less previous employment experience than men, and that post-program earnings gains declined markedly as previous employment experience increased, it is likely that differences in previous experience account for a large portion of the difference in the effectiveness of CETA training for men and women.

The Earnings Gap Between Men and Women

The large earnings gain experienced by female participants was not big enough to eliminate the initial gap between them and their male counterparts. On average, women earned $4,300 and men earned $6,800 in the year after leaving CETA training programs. The remaining gap primarily reflected the higher wage rates received by men, and to a lesser extent their greater labor force participation. In terms of finding and holding a job and the number of hours worked per week employed, the post-program experiences of female and male participants were essentially the same.

VARIATIONS IN RESULTS BY LENGTH OF TRAINING AND MINORITY STATUS OF PARTICIPANTS

Longer training was associated with larger earnings gains for women, but in general there was no effect for men, on average, regardless of the length of training. In addition, there was no consistent difference between the effects of training for minority and non-minority participants.

Variations by Length of Training

Longer classroom training, on-the-job training, and work experience were associated with larger earnings gains for female

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13. The observed earnings gain for men who were previously not employed, and to a lesser exent for women who were previously not employed, may reflect employment shifts from jobs not covered by Social Security to jobs that were covered. Thus they must be interpreted with caution. This was probably much less of a problem for persons with some past employment.

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participants (see Table 9). The average gain for women with 100 days of training (the average length of training was 150 days) was about $1,200 a year, whereas the corresponding gain for women with 200 days of training was $1,500. In addition, the relationship between the number of days of training and future earnings gains for women was roughly constant over the range of program lengths examined (from about 10 to 250 days).

The preceding findings should be interpreted with caution, however, in light of three important data limitations. First, it was not possible to measure program intensity in terms of the

TABLE 9. EARNINGS GAINS BY SEX, TYPE OF TRAINING, AND LENGTH OF TRAINING (In 1980 dollars)[a]

Training	Women[b]		Men[c]	
	100 Days	200 Days	100 Days	200 Days
All CETA Training	1,200	1,500	200	100
Classroom training	1,200	1,600	200	500
On-the-job training	1,000	1,700	400	-400[d]
Work experience	1,200	1,500	0	-400[d]

SOURCE: Estimates were derived from the Continuous Longitudinal Manpower Survey and the March 1976 Current Population Survey supplemented by individual Social Security earnings records.

a. For persons over 24 years old and in CETA training more than seven days.

b. All results for women were significant at the 0.01 level.

c. All results for men were not significant at the 0.05 level.

d. This result does not necessarily represent a negative effect because it is not statistically significant and thus cannot be distinguished from a finding of no effect.

number of hours of training per day. Second, it was not possible to distinguish on a consistent basis between persons who had completed training and persons who had dropped out prematurely. Third, it was not possible to separate the actual effect of lengthening training from selection effects due to women with the greatest potential staying in training the longest.

Variations by Minority Status

There was no consistent pattern in the observed differences in the effect of training for minority and non-minority persons (see Table 10).[14] Both minority and non-minority female participants experienced large future earnings gains, with some evidence of a smaller gain for minority women. But in five out of six cases, there was no significant effect for minority or non-minority male participants. The one exception to this rule--on-the-job training for minority males--produced the largest earnings gain for any group examined in Table 10. Because this result was based on the experience of only 130 participants (representing 4 percent of the sample) and because it was inconsistent with virtually all other findings in this paper, it should be interpreted with caution. Furthermore, because this finding produced a significant $600 overall average earnings gain for minority men when the results for both classroom training and work experience indicated no significant effect for this group, the overall average result for minority men should also be interpreted with caution.

INTERPRETATION OF THE FINDINGS

Chapter II indicated that the typical CETA training program provided relatively short-term training for entry-level jobs. This chapter has shown that the main effect on earnings of this training (when it has been effective) was to increase the amount of time that participants worked. Only a small effect on wage rates was observed and thus it appears that there was probably little effect on job skills.[15]

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14. Non-minority participants included all persons who were white and not Hispanic. Minority participants included everyone else.

15. Some effect on skills could have produced the observed increase in hours worked, however.

TABLE 10. EARNINGS GAINS BY SEX, MINORITY STATUS, AND TYPE OF TRAINING (In 1980 dollars)[a]

	Women[c]	Men
Minority Participants[b]	1,000	600[d]
In classroom training	1,100	300[e]
In on-the-job training	800[d]	1,500[f]
In work experience	900	300[e]
Non-Minority Participants[b]	1,300	-100[e]
In classroom training	1,300	300[e]
In on-the-job training	1,200	-200[e]
In work experience	1,400	-300[e]

SOURCE: Estimates were derived from the Continuous Longitudinal Manpower Survey and the March 1976 Current Population Survey supplemented by individual Social Security earnings records.

a. For persons over 24 years old and in CETA training more than seven days.

b. Non-minority participants include all persons who were white and not Hispanic. Minority participants include all other groups.

c. All results for women, except for on-the-job training for minority participants, were significant at the 0.01 level.

d. Significant at the 0.05 level.

e. Not significant at the 0.05 level. Negative results do not necessarily represent a negative effect, however, because these results are not statistically significant and thus cannot be distinguished from a finding of no effect.

f. Significant at the 0.01 level.

These findings are consistent with the result that CETA training worked best for persons with little or no past employment experience--the group with the greatest margin for responding to training's principal effect.

Similarly, these findings help to explain why female CETA participants (who have little past employment experience, on average) appeared to benefit more from training than male participants (with more past employment experience, but chronic low earnings) did.

Furthermore, the preceding findings help to explain why no consistent differences were observed in the effectiveness of the three major types of CETA training--classroom training, on-the-job training, and work experience. In theory, classroom training and on-the-job training emphasize the development of specific job skills whereas work experience emphasizes the development of general work habits. Thus the first two types of training might be expected to have a larger long-term impact on earnings. But in practice, none of the types of training appeared to improve skills substantially, perhaps because more extensive training would have been necessary. Their major effect was to increase the amount of time worked by participants, a task for which all three approaches might be equally well suited.

CHAPTER IV. ISSUES AND OPTIONS FOR FUTURE JOB-TRAINING PROGRAMS

This chapter examines several important issues in the design of future federal training programs:

- What are the employment problems facing low-income persons?
- Can job-training programs help this group?
- Is there a necessary federal role in providing job-training programs? and
- What training services would be most effective?

Two specific aspects of bills that are currently being considered as replacements for the Comprehensive Employment and Training Act (CETA) relate to the above questions--the eligibility criteria for determining which adults should participate in training programs, and the types of training services that would be available.[1] In addition, no matter how federal legislation resolves these issues, state or local program operators will continue to address the problems of whom to serve and what services to provide.

WHAT ARE THE EMPLOYMENT PROBLEMS FACING LOW-INCOME PERSONS?

Low-income persons do not all experience the same employment problems. Persons who have never worked or who have not worked for a long time may face major difficulty in entering or reentering the job market. Persons who have been employed but with

1. As mentioned previously, three main bills are currently proposed to replace CETA: the Administration's proposed Job Training Act of 1982 (S. 2184), the Training for Jobs Act (S. 2036) passed by the Senate, and the Job Training Partnership Act (H.R. 5320) reported by the House Committee on Education and Labor.

chronically low earnings, on the other hand, may need to be more stably employed and to increase their wage rates. Women are more likely to be members of the former group, whereas men are more likely to be members of the latter group.

Currently, CETA training programs do not explicitly distinguish between low-income persons with little or no previous job experience and those with chronically low earnings. Low-income persons are eligible to participate in CETA training programs under Title II-B if they are out of work, underemployed, in school, or receiving public assistance at the time they apply for training.[2]

Persons eligible to receive training do not necessarily have the same characteristics as those who enter training programs. In fiscal year 1980, at least 16 million persons were eligible for CETA training programs while only about 760,000 persons obtained training.[3] Approximately two-thirds of the eligible population were women and about three-quarters were in families receiving welfare payments.[4] Only one-third of the adults who became participants were members of families receiving welfare, however. Persons receiving welfare, often women, are more likely to be

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2. The current income criteria require that a person be a member of a family receiving public assistance or a member of a family whose income--excluding such sources as public assistance and unemployment insurance--during the previous six months on an annualized basis was such that (1) the family was eligible for public assistance or (2) the family income was less than or equal to 70 percent of the Bureau of Labor Statistics Lower Living Standard or (3) the family income was less than or equal to the Office of Management and Budget poverty guidelines.

3. This estimate of the eligible population, based on the March 1978 Current Population Survey (CPS) modified to represent fiscal year 1980, represents persons who would have been eligible during 1980. Since eligibility depends on the person's employment status, these data underestimate somewhat the current eligible population because the unemployment rate represented in the data was 6.8 percent, compared to an actual rate of 9.5 percent in June 1982.

4. These data on the eligible population and participants include persons under the age of 25.

members of the group with little previous job experience than are other low-income persons.

Two of the three proposals currently pending before the Congress would alter existing CETA eligibility criteria for adults. The Administration's proposal would serve two main groups: low-income youth and adults who were in families receiving Aid to Families with Dependent Children (AFDC). For adults, this change would focus training more heavily on women and persons with limited previous employment. The Senate bill would continue generally to serve low-income persons but would require that at least 50 percent of the funds be used for youth and that both persons receiving AFDC and high school dropouts be served in proportion to the size of the groups in the area's eligible population. This proposal would increase the number of welfare recipients in training programs and thus the proportion of participants with little previous job experience; however, the increase would not be as large under the Administration's proposal. The House Committee bill, on the other hand, would have separate training programs for youth and adults. For adults, the current eligibility criteria would essentially continue.

CAN JOB-TRAINING PROGRAMS HELP LOW-INCOME PERSONS?

Evidence reported in Chapter III suggests that CETA training benefited principally persons who had little previous job experience, as reflected by the fact that women, on average, benefited more than men. Their gains resulted from increased employment more than from increased wage rates, and may thus indicate only a small increase in skills.

Further evidence of the responsiveness to training of persons who had not previously been employed much is provided by the National Supported Work Demonstration Project. This project provided a tightly supervised, supportive work environment for persons experiencing long-term labor market problems. The group that benefited most from this program, in terms of later earnings, was women who had been receiving welfare for roughly three or more years and who had previous worked relatively little.[5]

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5. This demonstration project tested the effects of supported work on persons with severe employment problems, concentrating on four groups--women who had been receiving welfare for (Continued)

On the other hand, CETA training programs do not seem to improve the earnings of persons with chronically low earnings since, on average, men did not seem to benefit from training. Other types of training might improve the earnings of this group, however.

IS THERE A NECESSARY FEDERAL ROLE IN PROVIDING JOB-TRAINING PROGRAMS?

Another important issue is the role of the federal government in the funding and operation of training programs. Currently the federal government provides support for programs administered by state or local governments. To the extent that such programs might receive funding from other sources--for example, from state or local governments or the private sector--the federal government would not necessarily need to be involved. It seems unlikely that other sources would replace lost federal funding for such programs, however, since they have not done so in the past. In addition, there is some preliminary evidence that state and local governments are not replacing last year's federal funding reductions.[6]

If federal funding for CETA ceased and no alternative funding was provided, persons who would have entered CETA training programs probably would not obtain other training. Persons who had been employed relatively little would probably earn less in the future than they would have after receiving training. On the

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5. (Continued)
long periods, ex-addicts, ex-convicts, and young school dropouts. The project included 10 sites with 3,200 persons participating in supported work and 3,400 persons in the control group. All participants and control group members were volunteers who were then randomly assigned to the program and control groups. See Manpower Demonstration Research Corporation, Summary and Findings of the National Supported Work Demonstration (Ballinger Publishing Company, 1980).

6. See Richard P. Nathan, et al. "Initial Effects of the Fiscal Year 1982 Reductions in Federal Domestic Spending" (Urban Institute, May 1982).

other hand, previously employed persons with chronically low earnings would probably earn about the same in the future as they would if training were provided.

The extent of federal involvement in decision-making about program design could also vary. Under the current system, state or local governments determine whom to serve and what services to provide within federal guidelines. Continuing this system could provide participants the most effective services available if state or local program operators are more familiar with their specific training needs and opportunities than the federal government. On the other hand, program administrators may focus more on achieving short-term job placements rather than on the possibility of long-term earnings gains.

WHAT TRAINING WOULD BE MOST EFFECTIVE?

The employment needs and the types of training that are most effective at addressing these problems differ for persons with little previous employment experience and employed persons with chronically low earnings.

Persons with Little Previous Employment Experience

CETA training programs seemed to be effective for persons with limited work histories; they show greater overall earnings gains for women, who are more likely to have little or no job experience than men. This training is fairly short-term--on average about 20 weeks--and focuses primarily on the work habits, attitudes, and skills necessary for low-wage, entry-level jobs.

Whether current training is provided in a classroom setting, on-the-job, or through subsidized work experience appeared to make little difference in participants' average post-program earnings.[7] For all three types of training, the discounted value of participants' increased earnings over the next several years approximately equaled the federal costs of training. Classroom training costs somewhat more than work experience and on-the-job training, however.

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7. It is possible, however, that this result might differ for more extensive training that focused on higher-level skills.

Classroom training costs could be reduced by eliminating or restricting allowances for participants since these payments represent approximately one-half of costs. In fact, if all allowances were eliminated, classroom training could pay off more quickly than the other types of training. Although eliminating allowances for all persons could double the number of participants served for the same total cost, it might result in some persons being unable to participate for lack of income.[8] It is also possible that different types of people might then receive classroom training, with a different degree of effectiveness. Providing allowances based on need might alleviate these problems.

Since most of the earnings gain from CETA training programs was due to an increase in the amount of time worked, more emphasis on job placement services and less on formal training might achieve the same results as current training programs at a lower cost per participant. In particular, job placement services could be offered through job referral assistance or through job search assistance. Job referral assistance involves locating and developing job openings and matching job seekers with openings. Job search assistance involves teaching people how to look for jobs and supervising their search. Although job referral assistance generally costs less than job search assistance, intensive group search seems to produce higher placement rates.[9]

On the other hand, if the effect of CETA training programs on earnings is not due primarily to its assistance in facilitating entry or reentry into the labor market, focusing mostly on placement services might be unsuccessful. It might also seriously limit potential future earnings growth by reducing the emphasis on increasing skills. Unfortunately, the data were not available to determine whether or not the main effect of CETA training results from its provision of placement services.

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8. Although eliminating allowances would reduce CETA spending, federal spending on other programs could increase if participants obtained income assistance from other programs.

9. Proponents of group job search argue that it is effective because it resembles the way in which people generally find jobs--through informal contacts and the use of multiple job-search methods. See Elise Bruml and John Cheston, "Placement Assistance in the ES, WIN and CETA" (paper funded in part from U.S. Department of Labor, March 1982).

All bills currently being considered would change the types of services allowed, although in varying degrees. Currently CETA programs provide many services, including classroom training, on-the-job training, work experience, job placement assistance, and allowances for participants while being trained. The Administration's proposal would eliminate work experience and allowances for participants. The Senate bill would also eliminate work experience and current participant allowances. On the other hand, the House Committee bill would retain work experience and, for needy persons, allowances.

Previously Employed Persons with Chronically Low Earnings

None of the current types of training seemed to help persons with chronically low earnings--more often, men than women. For this group, for whom there is a smaller margin for increasing the amount of time worked, greater reliance must be placed on raising wage rates. Obtaining higher-wage jobs requires greater skills, which in turn probably requires more extensive, and thus more expensive, training. In other words, to increase substantially the future earnings of recently employed persons with chronically low earnings would require concentrating more resources on fewer individuals.

For this group, the magnitude of the potential benefits of extensive training is uncertain; however, some results from a CETA demonstration project, the Skill Training Improvement Program, that provided training for more highly skilled jobs, suggest that positive results might be possible.[10] This study of 15 prime sponsors indicated that a greater proportion of these participants obtained jobs when leaving the program, and at higher wage rates, than participants in CETA comprehensive programs. The study did not, however, examine the long-term effects and did not include a control group.

Bills currently before the Congress would allow, but not require, longer training.

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10. See Abt Associates, Inc., STIP I: CETA and the Private Sector (prepared for U.S. Department of Labor, September 1979).

APPENDIX A. ESTIMATING THE EFFECT OF CETA TRAINING ON PARTICIPANTS' FUTURE EARNINGS

This appendix expands the discussion in Chapter III of how the effect of CETA training programs was estimated. It provides an overview of the methodology, a brief description of the data, a discussion of the statistical model, and an explanation of the estimation procedure. Further methodological issues are discussed in Appendixes B through H.

OVERVIEW OF THE METHODOLOGY

The methodology used to estimate the effect of training can be described approximately in five basic steps. The outcome of each step is presented in Table A-1.

Step 1: Estimating Participants' Post-Program Shifts From Their Past Earnings Trends

A linear trend fit through 1970-1973 annual earnings for each CETA participant was used to predict future earnings in the absence of training (see Figure A-1).[1] A $1,100 average difference (in nominal dollars) between actual and predicted post-program earnings was obtained for female participants and a $100 average difference was obtained for male participants.

Step 2: Accounting for Changing Economic Conditions

Corresponding shifts from past earnings trends were estimated for comparison group members during the post-program period. These shifts (roughly $300 for women and $200 for men, in nominal dollars) were subtracted from the results of Step 1 to account for changes in economic conditions affecting everyone during this period.

1. Figure A-1 is the same as Figure 7 in Chapter III.

TABLE A-1. ESTIMATES OF AVERAGE ANNUAL POST-PROGRAM EARNINGS GAINS AT EACH STEP IN THE ANALYSIS[a]

At the End of:	For Women	For Men
Step 1: Obtaining the Basic Finding (in nominal dollars)	1,100[b]	100[c]
Step 2: Accounting for Changing Economic Conditions (in nominal dollars)	800[b]	-100[c]
Step 3: Also Accounting for the Unusually Low Earnings in the Year Before Training (in nominal dollars)	900[b]	-100[c]
Step 4: Also Accounting for Inflation (in 1980 dollars)	1,100[b]	-100[c]
Step 5: Also Accounting for Individual Socioeconomic Differences (in 1980 dollars)	1,300[b]	200[c]

SOURCE: Estimates were derived from the Continuous Longitudinal Manpower Survey and the March 1976 Current Population Survey supplemented by individual Social Security earnings records.

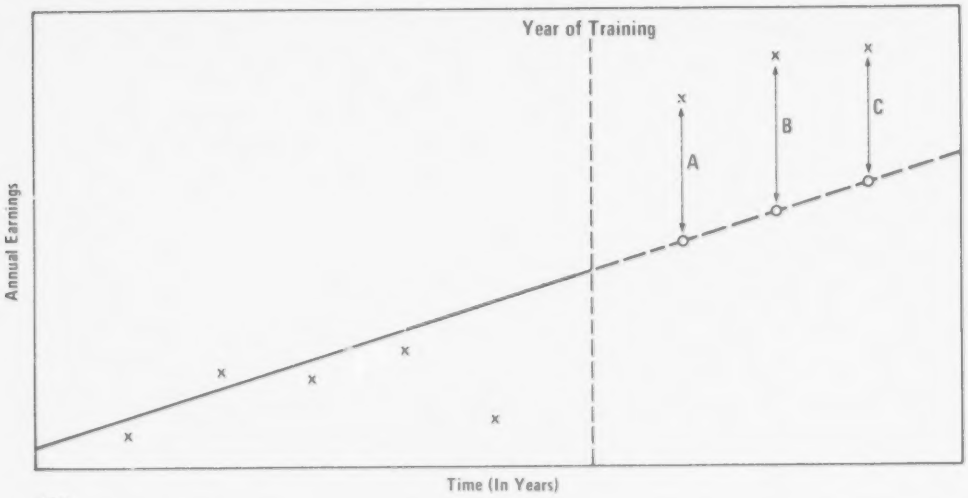
a. For persons over 24 years of age and in CETA training more than seven days.

b. Significant at the 0.01 level.

c. Not significant at the 0.05 level.

Figure A-1.

Earnings After Training Relative to the Past Long-Term Earnings Trend of a CETA Participant Who Experienced a Post-Program Earnings Gain



KEY:
x = Actual annual earnings
O = Predicted annual earnings without training
A, B, and C = Difference between actual and predicted earnings

Step 3: Accounting for Participants' Unusually Low Earnings In the Year Before They Entered Training

Male participants earned an average of roughly $1,200 (in nominal dollars) below their earnings trend, and female participants earned an average of $400 below their earnings trend in the year before they entered a training program. Appendix B estimated the rate at which these "pre-program dips" probably would have disappeared in the absence of training. This rate (which was quite fast) was used to estimate the portion of the pre-program dip that would have remained without training (less than $100, on average, for both male and female participants—see Appendix B), and the results of Step 2 were adjusted to account for this factor.

Step 4: Accounting for Inflation

Estimates of post-program earnings gains were based on data for several different years. To combine these results in consistent monetary units, they were all expressed in 1980 dollars, using the Personal Consumption Expenditures component of the implicit price deflator for Gross National Product.

Step 5: Accounting for Individual Differences in Personal Characteristics

Results to this point accounted for individual differences in past earnings trends, which in turn accounted for individual differences in measurable factors, such as age and education, and unmeasurable factors, such as motivation, that affect potential future earnings. However, to the extent that some of these measurable factors predict likely changes in behavior that produce substantial future deviations from past earnings trends, it was necessary to account for these factors explicitly in the analysis.

This was done by including a variety of personal characteristics as independent variables in the regression model described below.[2] Doing so raised the estimate of the effect of training

2. Personal characteristics included were age, age squared, education level, education level squared, family size, minority status, and whether or not the individual: was a household head; was currently married; was never married; had children under 4; had children between 4 and 6; and had children between 7 and 18.

for women from $1,100 to $1,300 and changed the estimate for men from an insignificant -$100 to an insignificant +$200.

THE DATA

Estimates of the effect of training were based on data from the Continuous Longitudinal Manpower Survey for 3,223 CETA participants and data from the March 1976 Current Population Survey for 30,668 comparison group members. The participant sample contained 932 women and 677 men who had been in classroom training, 236 women and 414 men who had been in on-the-job training, and 447 women and 517 men who had been in work experience programs. Tables A-2 and A-3 describe these groups.

In addition to the survey data, individual earnings data for many years before training and up to three years after training were available from each CETA participant's Social Security record. Data for two post-program years were obtained for almost all participants, and data for the third post-program year were obtained for about half of the participants. Corresponding Social Security earnings data were also obtained for all comparison group members. The validity of these longitudinal earnings data was examined in Appendix C and found to be quite satisfactory.

The sample of participants was composed of persons over 24 years old who entered CETA classroom training, on-the-job training, or work-experience programs (not public service employment) between January 1975 and June 1976 and stayed in the program more than seven days. Persons over 24 were chosen to focus on adults with meaningful past earnings experience. Participants in public service employment were excluded to focus directly on CETA's comprehensive training title. Persons entering between January 1975 and June 1976 were chosen because they were the only groups for which appropriate data were available at the time of the analysis. And persons staying in the program for more than seven days were selected both to ensure a minimal exposure to training and to be consistent with the criterion used by Westat, Inc., in previous analyses of these data.[3]

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3. See Westat, Inc., Continuous Longitudinal Manpower Survey: The Impact of CETA on Participant Earnings, Working Paper No. 2 (U.S. Department of Labor, June 1980), p. 2-3.

TABLE A-2. CHARACTERISTICS OF FEMALE PARTICIPANTS AND COMPARISON GROUP MEMBERS IN THE SAMPLE[a]

	Classroom Training	On-the-Job Training	Work Experience	All CETA Training	Comparison Group Members
Average Number of Days in CETA	150	120	162	149	---
Average Age	34	35	37	35	41
Average Years of Education Completed	10.9	11.4	11.5	11.1	12.5
Average Number of Family Members	3.7	3.4	3.7	3.7	3.5
Percentage Minority	54	41	36	47	19
Percentage Currently Married	32	45	38	35	77
Percentage Never Married	13	12	15	13	6
Percentage Formerly Married	55	43	47	51	17
Percentage with Children Under 4	10	11	7	9	17
Percentage with Children Between 4 and 6	5	8	7	6	21
Percentage with Children Between 7 and 18	13	14	15	14	51

NOTE: All information pertains to the date of entry for CETA participants and to March 1976 for comparison group members.

a. Includes only persons who were over 24 years old and, for CETA participants, also includes only persons who were in a training program for more than seven days.

TABLE A-3. CHARACTERISTICS OF MALE PARTICIPANTS AND COMPARISON GROUP MEMBERS IN THE SAMPLE[a]

	Classroom Training	On-the-Job Training	Work Experience	All CETA Training	Comparison Group Members
Average Number of Days in CETA	132	120	139	131	---
Average Age	33	33	36	34	39
Average Years of Education Completed	11.1	11.3	10.8	11.0	12.3
Average Number of Family Members	3.5	3.2	3.4	3.4	3.2
Percentage Minority	52	32	38	42	23
Percentage Currently Married	55	62	54	57	76
Percentage Never Married	27	19	25	24	14
Percentage Formerly Married	18	19	21	19	10
Percentage with Children Under 4	8	7	6	7	21
Percentage with Children Between 4 and 6	5	4	7	6	17
Percentage with Children Between 7 and 18	13	12	12	12	36

NOTE: All information pertains to the date of entry for CETA participants and to March 1976 for comparison group members.

a. Includes only persons who were over 24 years old and, for CETA participants, also includes only persons who were in a training program for more than seven days.

Participants were divided into two groups according to when they entered the program. The first group--referred to as 1975 participants--included all persons who entered between January and August 1975. The second group--referred to as 1976 participants --included all persons who entered between September 1975 and June 1976. This split was made to minimize the timing mismatch for the definition of the year immediately before training (the year of the "pre-program dip"). Because Social Security earnings data were only reported by calendar year, 1974 was defined as the pre-program year for 1975 participants and 1975 was defined as the pre-program year for 1976 participants. The first post-program year for an individual member of either group was defined as the first full calendar year after that person left a training program.

The comparison group was defined to include all persons from the March 1976 Current Population Survey who earned less than the maximum earnings reported by Social Security records in every year between 1970 and 1975; who were between 25 and 60 years old; and who were members of families with incomes of less than $30,000 in 1975.[4]

THE STATISTICAL MODEL

The effect of CETA training was estimated from the following model:

$$Y_{it} = \alpha_i + \beta_i \cdot t + \gamma \cdot T_{it} + \sum_j \delta_j \cdot X_{ji} + \epsilon_t + \epsilon_{it} \qquad (A1)$$

and

$$\epsilon_{it} = \rho \cdot \epsilon_{it-1} + V_{it} \qquad (A2)$$

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4. The maximum earnings covered by Social Security and thus reported by Social Security records were $7,800, $7,800, $9,000, $10,800, $13,200, and $14,100 from 1970 through 1975, respectively. Persons in families with incomes greater than $30,000 were eliminated to be consistent with analysis by Westat, Inc., who supervised development of the data base. See Westat, Inc., Continuous Longitudinal Manpower Survey: The Impact of CETA on Participant Earnings, Working Paper No. 2 (U.S. Department of Labor, June 1980), p. 2-2.

where:

Y_{it} = person i's earnings in year t;

t = time (the last two digits of calendar year t);

T_{it} = one if year t was after person i terminated from training and zero otherwise (thus it was always zero for comparison group members);

X_{ji} = the jth personal characteristic for person i;

ϵ_t = a year-specific error component reflecting economic conditions;

ϵ_{it} = the individual error component for person i in year t;

V_{it} = the random portion of person i's error component in year t;

α_i and β_i = the intercept and slope of person i's earnings trend;

γ = the average effect of CETA training on future annual earnings;

δ_j = the coefficient for the jth personal characteristic; and

ρ = a first-order serial correlation coefficient that varied by sex.

Equation A1 specifies separate earnings trends with parameters α_i and β_i for each person in the sample. In addition, personal characteristics, X_{ji}, were included to account for systematic differences in likely deviations from past earnings trends.

A dummy variable, T_{it}, was included to distinguish observations representing post-program years for participants from all other observations. Its coefficient, γ, was the average effect of training. For some of the analyses, T_{it} was replaced by a separate dummy variable to measure the effect of each major type of training.

Equation A1 specifies two error components. The first component, ϵ_t , represents the average effect of fluctuating economic conditions on everyone in the sample. The second component, ϵ_{it} , represents the result of idiosyncratic events affecting each individual.

Lastly, Equation A2 specifies a serial correlation process to represent possible relationships over time in the effects of individual idiosyncratic experiences.

The preceding model is an extension of the fixed-effect model of heterogeneous earnings functions used by Kiefer (1979).[5] The fixed-effect model specifies one person-specific parameter for each individual to account for unique characteristics that cannot be measured directly. Equation A1, however, specifies two person-specific parameters per individual to account for unmeasured factors affecting both the underlying level and the change over time in individual long-run earnings potential.

In addition, the model is a direct extension of covariance models used in econometrics to pool multiple time-series (see Pindyck and Rubinfeld (1976)) and is an application of interrupted time-series analysis used widely for evaluation research (see Campbell (1975)).[6]

THE ESTIMATION PROCEDURE

The model was estimated in several stages in order to accommodate separate intercepts and slopes for each person and to incorporate the serial correlation structure.

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5. See Nicholas M. Kiefer, "Population Heterogeneity from Panel Data on the Effects of Vocational Education," Journal of Political Economy, vol. 87. no. 5, pt. 2 (October 1979), pp. 213-26.

6. See Robert S. Pindyck and Daniel L. Rubinfeld, Econometric Models and Economic Forecasts (McGraw-Hill, Inc., 1976), pp. 203-06. Also see Donald T. Campbell, "Reforms As Experiments," in Elmer L. Struening and Marcia Guttentag, eds., Handbook of Evaluation Research, Vol. 1 (SAGE Publications, 1975), pp. 75-86.

Estimating Individual Trends

Estimates $\hat{\alpha}_i$ and $\hat{\beta}_i$ of the intercepts and slopes, α_i and β_i, were obtained from pre-program-year earnings data for 1970 through 1973 (excluding the year immediately before participants began training). Thus by definition:

$$\hat{\alpha}_i + \hat{\beta}_i \cdot t \equiv \alpha_i + \beta_i \cdot t + W_{it} \qquad \text{(A3)}$$

where W_{it} is a random error. Substituting Equation A3 into Equation A1 yields:

$$(Y_{it} - \hat{\alpha}_i - \hat{\beta}_i \cdot t) = \gamma \cdot T_{it} + \sum_j \delta_j \cdot X_{ji} + \epsilon_t + \epsilon_{it} - W_{it} \qquad \text{(A4)}$$

or

$$\hat{DEV}_{it} = \gamma \cdot T_{it} + \sum_j \delta_j \cdot X_{ji} + \epsilon_t + \epsilon_{it} - W_{it} \qquad \text{(A5)}$$

where $\hat{DEV}_{it}$, person i's observed deviation in year t from his or her estimated trend, can be computed directly from post-program earnings data for participants and corresponding data (for 1976 through 1978) for comparison group members.

Incorporating Serial Correlation

The next step was to incorporate the serial correlation process, in order to account for the unusually low earnings experienced by participants in the year before they entered training. This was accomplished as follows. Equation A2 implies that:

$$\epsilon_{it} = \rho^s \cdot \epsilon_{it-s} + V_{it}' \qquad \text{(A6)}$$

where t-s is the year before entering a CETA program (or a corresponding year for comparison group members), t is a post-program year (or a corresponding year for comparison group members), and V_{it}' is a linear combination of person i's random individual error components for years t-s through t. Substituting Equation A6 into Equation A5 yielded:

$$\hat{DEV}_{it} = \gamma \cdot T_{it} + \sum_j \delta_j \cdot X_{ji} + \epsilon_t + \rho^s \cdot \epsilon_{it-s} + V_{it}' - W_{it} \qquad \text{(A7)}$$

Because ϵ_{it-s} and T_{it} were correlated (participants had a pre-program dip but comparison group members did not), ignoring ϵ_{it-s} would produce estimates of γ, the effect of training, that

contained a bias proportional to ρ^s. Because ρ appeared to be quite small (see Appendix B) this bias was probably also quite small. Nevertheless it was eliminated as follows.

ϵ_{it-s} was estimated by $\hat{\epsilon}_{it-s}$, the observed deviation from the 1970-1973 trend, in the year before participants entered a training program and in a corresponding year for comparison group members.[7] ρ was estimated as described in Appendix B separately for men and women. Substituting $\hat{\rho}^s$ and $\hat{\epsilon}_{it-s}$ for ρ^s and ϵ_{it-s} in Equation A7 yielded:

$$\hat{DEV}_{it} = \gamma \cdot T_{it} + \sum_j \delta_j \cdot X_{ji} + \epsilon_t + \hat{\rho}^s \cdot \hat{\epsilon}_{it-s} + Z_{it} + V_{it}' - W_{it} \quad \text{(A8)}$$

where Z_{it} was the error in estimating $\rho^s \cdot \epsilon_{it-s}$ (which was correlated with $\hat{\rho}^s \cdot \hat{\epsilon}_{it-s}$, but was independent of T_{it} and the X_{ji}). Subtracting $\hat{\rho}^s \cdot \epsilon_{it-s}$ from both sides of Equation A8 and simplifying the notation yielded:

$$\hat{\hat{DEV}}_{it} = \gamma \cdot T_{it} + \sum_j \delta_j \cdot X_{ji} + \epsilon_t + U_{it} \quad \text{(A9)}$$

where $\hat{\hat{DEV}}_{it}$ was the deviation from trend in post-program year t, adjusted for the deviation from trend in pre-program year t-s and U_{it} equalled $Z_{it} + V_{it} - W_{it}$.

Accounting for Inflation

The next step was to express the dependent variable in 1980 dollars using the Personal Consumption Expenditures component of the implicit price deflator for Gross National Product. This yielded:

$$\hat{\hat{DEV}}_{it}^* = \gamma^* \cdot T_{it} + \sum_j \delta_j^* \cdot X_{ji} + \epsilon_t^* + U_{it}^* \quad \text{(A10)}$$

where the stars indicate values in 1980 dollars.

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7. 1974 and 1975 were used as comparison group counterparts to the year immediately before training in proportion to their occurrence as the pre-program year for participants.

Estimating the Final Model

To estimate Equation A10 from a pooled sample of data for different post-program years for participants and corresponding years (between 1976 and 1978) for comparison group members, it was expressed as:

$$\hat{\hat{DEV}}_{it}^{*} = \gamma^{*} \cdot T_{it} + \sum_{j} \delta_{j}^{*} \cdot X_{ji} + \sum_{m} \epsilon_{m}^{*} \cdot YR_{m} + U_{it}^{*} \qquad (A11)$$

where the YR_m were separate dummy variables to represent 1976, 1977, and 1978.

Variations of Equation A11 were the basis for all estimates of the effect of training.

APPENDIX B. ACCOUNTING FOR THE UNUSUALLY LOW EARNINGS EXPERIENCED BY PARTICIPANTS IN THE YEAR BEFORE THEY ENTERED A CETA TRAINING PROGRAM

Figures 1 through 6 in Chapter III illustrate that the average earnings of CETA participants in the year before they entered training were noticeably below their past trend. To the extent that this "pre-program dip" was a temporary aberration, from which participants soon would have recovered without training, their recovery should not be counted as part of the effect of the program. On the other hand, to the extent that this dip would have remained without training, participants' observed recovery should be counted as part of the effect of training. Because of the magnitude of this phenomenon for male participants, its interpretation and corresponding treatment can affect estimates of program impact for this group substantially.

The best data available indicate that almost all of the pre-program dip would have disappeared in the absence of training by the first or second post-program year (in other words, two to three years after the dip occurred). Final estimates of the effect of training were adjusted to take this factor into account explicitly, but because very little of the dip was estimated to persist, this adjustment was minor (less than $100, on average, for both male and female participants).

The following sections examine alternative explanations for the pre-program dip, summarize estimates of the rate at which it probably would have disappeared in the absence of training, and outline how these estimates were obtained.

ALTERNATIVE EXPLANATIONS OF THE PRE-PROGRAM DIP

A temporary pre-program dip of some magnitude was almost certainly produced by the fact that eligibility for CETA programs was based on short-term rather than long-term labor market experience. This phenomenon is an example of a common statistical

artifact, generally referred to as regression to the mean.[1] It occurred as follows:

An individual's earnings in any given year can be expressed as the sum of three components:

- o a long-term component reflecting his or her underlying earnings potential;
- o a short-term component reflecting idiosyncratic events that uniquely affected him or her that year; and
- o a short-term component reflecting economic conditions that affected everyone that year.

The third component was accounted for explicitly in estimates of the effect of training through the use of a comparison group (see Appendix A) and was not a factor in the determination of the pre-program dip.

The long-term component--commonly referred to as permanent income--is a function of individual personal characteristics such as age, sex, race, training, education, motivation, and past experience. Because of differences in these and other related factors, some persons can generally be expected to earn more than others, on average.

In addition, everyone is subject to idiosyncratic events--such as being fired because of a fight with the boss; having unusually good or bad luck finding a new job; being in the right place at the right time for a promotion; or being laid off by a bankrupt employer--that produce good years and bad years relative to one's earnings potential.

Basing CETA eligibility only on recent experience eliminates many persons who have a relatively low earnings potential but have just experienced an unusually good year (i.e., persons with positive individual temporary earnings components). In addition, it establishes eligibility for participation for persons with a somewhat higher earnings potential who have recently experienced an unusually bad year (i.e., persons with negative individual

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1. See Donald T. Campbell and Julian C. Stanley, Experimental and Quasi-Experimental Designs for Research (Rand McNally and Company, 1966), p. 10.

temporary earnings components). Furthermore, even among persons eligible for CETA, those who have recently experienced an unusually bad year are probably more highly motivated to apply than are those who have recently experienced an unusually good year.

All of these factors work in the same direction to produce the result that CETA programs enroll a disproportionate number of persons who have recently experienced an unusually bad year. Thus, their average individual short-term component is negative and their overall average earnings are below their "normal" long-term level. This average negative short-term component could (and, according to the empirical results reported below, does) explain the pre-program dip. In future years, as random idiosyncratic events produce equal proportions of positive and negative individual temporary earnings components, overall average earnings will increase back to "normal" in the absence of training.

On the other hand, it is sometimes argued that persons who recently experienced a permanent decline in their future earnings recognize the permanence of this change and apply for CETA training. This would produce a pre-program dip that would not disappear in the absence of training.

This explanation is based primarily on the experience of displaced workers who have lost specialized well-paying, stable jobs in declining regions or industries and have little prospect of regaining their former economic status. But CETA participants are disadvantaged individuals with little previous work experience or with a history of low-paying, unstable jobs. Thus, the typical jobs held in the past by CETA participants were probably not specialized and were unlikely to be any more difficult to replace than other past jobs had been.

Therefore, although persons having just experienced an unusually bad year are probably more likely to apply for CETA training, it is unlikely that many CETA participants experienced large permanent declines from their already low unstable earnings patterns. Furthermore, given the high variability in individual earnings for this group, it is unlikely that applicants could determine whether or not the decline they had experienced was permanent or temporary.

SUMMARY OF THE EMPIRICAL EVIDENCE

Ideally, to measure the rate at which the pre-program dip would have disappeared in the absence of training, one must observe what happened to persons who were identical to the CETA participants, but who did not enter the program.[2] Unfortunately, without a true experiment based on random assignment of applicants to training and a control group, this was not possible.

Nevertheless, there were two independent sources of information from which to approximate the rate at which the pre-program dip would have disappeared without training: the past experience of participants, and the experience of comparison group members during the pre-to-post-program period. For both groups, yearly fluctuations in earnings disappeared quickly.

CETA participants (especially men) experienced large, unrelated year-to-year fluctuations in earnings before they entered the program. During this period, they both recovered rapidly from unusually bad years and failed to maintain the levels they reached during unusually good years.

Similarly, there was little relationship between the relative performance of comparison group members during the pre-program year (1974 or 1975) and the post-program years (1976-78). Persons doing unusually poorly or unusually well during the pre-program year were back on their trends by the post-program period, on average.

These findings were based on estimates of the correlation between deviations from trend in one year and subsequent deviations from trend. A strong positive correlation would indicate that such deviations disappeared slowly, whereas a weak positive correlation would indicate a quick disappearance. A negative correlation (which was unlikely and did not occur) would indicate a systematic pattern of good years followed by bad years and vice versa.

Weak positive correlations (that is, deviations that disappeared rapidly) were observed for all groups. Based on these correlations and the average pre-program dip of $1,200 for male CETA participants and $400 for female participants, Table B-1

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2. These persons must be identical, <u>on average</u>, in terms of factors that affect future earnings.

indicates the portion of the pre-program dip that probably would have remained in the absence of training. The manner in which these results were obtained is explained later in this appendix.

Judged by the past ability of male CETA participants to recover from unusually bad years, virtually none of their pre-program dip would have remained in the absence of training. Judged by corresponding results for comparison group members, roughly 11 percent or $130 would have remained during the first year after training, 4 percent or $50 would have remained during the second year, and 1 percent or $10 would have remained during the third year, on average. Similar results were obtained for women, although they were based on a smaller pre-program dip and a slower rate at which the dip disappeared.

Results in Table B-1 for the comparison group were used to adjust estimates of the effect of training to account for the pre-program dip. This was done to reduce the chances of undercompensating for this factor.

DESCRIPTION OF HOW THE RESULTS WERE OBTAINED

Appendix A developed the following model to estimate the effect of training:

$$Y_{it} = \alpha_i + \beta_i \cdot t + \gamma \cdot T_{it} + \sum_j \delta_j \cdot X_{ji} + \epsilon_t + \epsilon_{it} \qquad (B1)$$

and

$$\epsilon_{it} = \rho \cdot \epsilon_{it-1} + V_{it} \qquad (B2)$$

where:

Y_{it} = person i's earnings in year t;

t = time (the last two digits of calendar year t);

T_{it} = one if year t is after person i terminated from training and zero otherwise;

X_{ji} = the jth personal characteristic for person i;

ϵ_t = a year-specific error component reflecting macroeconomic conditions;

TABLE B-1. ESTIMATED PORTION OF THE PRE-PROGRAM DIP THAT WOULD HAVE REMAINED IN THE ABSENCE OF TRAINING

	Women				Men			
	First Post-Program Year	Second Post-Program Year	Third Post-Program Year	Average For The Post-Program Period[b]	First Post-Program Year	Second Post-Program Year	Third Post-Program Year	Average For The Post-Program Period[b]
Based on the Past Experience of CETA Participants								
In percents	12	4	1	7	0	0	0	0
In dollars[a]	50	20	0	30	0	0	0	0
Based on the Experience of Comparison Group Members								
In percents	27	14	7	18	11	4	1	6
In dollars[a]	110	60	30	70	130	50	10	70

a. Rounded to the nearest 10 nominal dollars.

b. For an average post-program period of 2.5 years.

ϵ_{it} = the individual error component for person i in year t;

V_{it} = the random portion of person i's error component in year t;

α_i and β_i = the intercept and slope of person i's earnings trend;

δ_j = the coefficient for the jth personal characteristic;

γ = the average effect of CETA training on future annual earnings; and

ρ = a first-order serial correlation coefficient that varies by sex.

The first-order serial correlation coefficient ρ measures the extent to which ϵ_{it-1}, the deviation from trend in year t-1, persists in year t. Thus it provides a direct measure of the persistence of the pre-entry dip because:

$$\epsilon_{it} = \rho^s \cdot \epsilon_{it-s} + V_{it}' \qquad \text{(B3)}$$

where ϵ_{it-s} is the pre-entry dip (the deviation from trend in pre-entry year t-s), s is the number of years between the post-program year t and the pre-entry year t-s, and V_{it}' is a linear combination of person i's individual random error components between years t-s and t.

If ρ were one the pre-entry dip would be permanent, and if ρ were zero the dip would be entirely temporary--that is, it would completely disappear on average by the next year. Between these two extremes the dip persists over time at the rate ρ^s. For example, if ρ were 0.5 half of the dip would remain after one year, one-quarter or ρ^2 would remain after two years, and one-eighth or ρ^3 would remain after three years, on average.

Basic Approach to Estimating ρ

As previously indicated, ρ was estimated from the experience of comparison group members during the pre-to-post-program period. The estimation procedure used for this purpose is described below. The same procedure was also used to estimate ρ from the experience of CETA participants before they entered the program by redefining the time period involved.

Defining 1974 as year t-s and 1976 as year t for the comparison group, one could, in theory, estimate ρ from Equation B3. A second estimate could be obtained by redefining 1977 as year t and reestimating Equation B3. A third estimate could be obtained by redefining t as 1978. But Equation B3 requires data on the true deviations from trend, ϵ_{it} and ϵ_{it-s}, which are not directly measurable.

Fortunately, estimates ($\hat{\epsilon}_{it}$ and $\hat{\epsilon}_{it-s}$) of these deviations could be obtained and were used instead. These estimates were obtained by computing a linear trend (estimating α_i and β_i) from individual earnings for four years before t-s and computing deviations from this trend in years t and t-s.

$\hat{\epsilon}_{it}$ was then regressed on $\hat{\epsilon}_{it-s}$ as follows:

$$\hat{\epsilon}_{it} = \theta + \psi_s \cdot \hat{\epsilon}_{it-s} + V_{it}'' \qquad \text{(B4)}$$

Intuitively it would seem that ψ_s from Equation B4 is the same as ρ^s and thus provides a direct estimate of ρ . This is not true, however. Because $\hat{\epsilon}_{it}$ and $\hat{\epsilon}_{it-s}$ were based on the same trend, which was estimated with error, they contained a common error component, which produced an artificial positive correlation between them. Thus ψ_s simultaneously reflected two correlations: the artificial correlation due to the common error component and the true serial correlation.

But estimates of ψ_s can be transformed to eliminate the artificial correlation and produce consistent estimates of ρ . These transformations are presented below.[3]

For t corresponding to the first post-program year (two years after t-s):

$$\psi_2 = \frac{2.5 - 0.1\rho - 0.8\rho^2 - 2.7\rho^3 + 0.6\rho^4 + 0.5\rho^6}{2.5 - \rho - 1.5\rho^2 - \rho^3 + \rho^4} \qquad \text{(B5)}$$

For t corresponding to the second post-program year (three years after t-s):

$$\psi_3 = \frac{3.0 - 0.15\rho - 2.2\rho^2 - 1.05\rho^3 + 0.4\rho^4 - 0.5\rho^5 + 0.5\rho^6}{2.5 - \rho - 1.5\rho^2 - \rho^3 + \rho^4} \qquad \text{(B6)}$$

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3. A derivation will be made available upon request.

And for t corresponding to the third post-program year (four years after t-s):

$$\psi_4 = \frac{3.5 - 0.2\rho - 2.6\rho^2 - 2.4\rho^3 + 2.7\rho^4 - \rho^5 - 0.5\rho^6 + 0.5\rho^8}{2.5 - \rho - 1.5\rho^2 - \rho^3 + \rho^4} \quad \text{(B7)}$$

Corresponding expressions for ρ in terms of ψ_s were not readily available, so a numerical conversion table was produced (see Table B-2). Working from this table, estimates of ψ_s obtained by applying ordinary least squares to Equation B4 were transformed to obtain consistent estimates of ρ .

Findings for Women and Men

The preceding analysis was conducted for the comparison group based on the relationship between their 1976, 1977, and 1978 (year t) deviations and their 1974 (year t-s) deviations from their 1970-1973 trends. Resulting estimates of ψ_s from Equation B4 and corresponding transformed values of ρ from Equations B5, B6, and B7 are presented in Table B-3.

Estimates of ρ ranged from 0.20 to 0.43 and averaged 0.33 for male comparison group members. Thus, on average, roughly 33 percent of a deviation from trend remained after one year, 11 percent remained after two years, 4 percent remained after three years, and 1 percent remained after four years. Deviations from trend for women appeared to disappear less quickly, with estimates of ρ ranging from 0.45 to 0.57 and averaging 0.52.

A similar analysis was based on the past earnings history of CETA participants. The experiences of 1975 and 1976 participants were considered separately.[4] For 1975 participants, year t was defined as 1971, 1972, or 1973, year t-s was defined as 1969, and the trend period was 1965-1968. For 1976 participants, year t was defined as 1972, 1973, or 1974, year t-s was defined as 1970, and the trend period was 1966-1969.

Results for both groups of participants were similar, yielding serial correlation coefficients averaging 0.06 for men and 0.34 for women. These coefficients were smaller than their

4. As explained in Appendix A, 1975 participants were defined as persons who entered CETA programs between January and August, 1975. 1976 participants were defined as entrants between September 1975 and June 1976.

TABLE B-2. THE RELATIONSHIP BETWEEN ρ AND ψ_s

ρ	ψ_2	ψ_3	ψ_4
0.00	1.000	1.200	1.400
0.05	1.019	1.221	1.424
0.10	1.040	1.242	1.448
0.15	1.063	1.264	1.472
0.20	1.087	1.287	1.496
0.25	1.112	1.310	1.520
0.30	1.139	1.335	1.545
0.35	1.167	1.360	1.570
0.40	1.195	1.387	1.596
0.45	1.224	1.415	1.624
0.50	1.253	1.445	1.652
0.55	1.282	1.475	1.682
0.60	1.311	1.506	1.714
0.65	1.339	1.538	1.747
0.70	1.367	1.570	1.780
0.75	1.392	1.601	1.815
0.80	1.415	1.630	1.848
0.85	1.436	1.657	1.879
0.90	1.452	1.679	1.906
0.95	1.463	1.694	1.926
1.00	1.375	2.250	2.667

SOURCE: Computations were based on Equations B5, B6, and B7.

TABLE B-3. ESTIMATES OF ψ_s AND ρ

	Women		Men	
	ψ_s	ρ	ψ_s	ρ
Based on the Past Experience of CETA Participants				
For 1975 participants[a]				
s=2	1.1497	0.32	1.0856	0.20
s=3	1.3436	0.32	1.2226	0.05
s=4	1.4254	0.05	1.4150	0.03
For 1976 participants[b]				
s=2	1.2262	0.45	0.9987	0.00
s=3	1.3926	0.41	1.2202	0.05
s=4	1.6366	0.47	1.4125	0.03
Based on the Experience of Comparison Group Members				
s=2	1.2964	0.57	1.2106	0.43
s=3	1.4713	0.54	1.3598	0.35
s=4	1.6225	0.45	1.4976	0.20

a. Participants over 24 years old who entered between January and August, 1975, and stayed in the program more than seven days.

b. Participants over 24 years old who entered between September 1975 and June 1976, and stayed in the program more than seven days.

counterparts for comparison group members. As indicated previously, however, the average results for comparison group members (ρ = 0.3 for men and ρ = 0.5 for women) were used to adjust for the pre-program dip in estimates of the effect of training (see Appendix A). This was done to reduce the likelihood of undercompensating for this factor.

APPENDIX C. VALIDATING THE SOCIAL SECURITY EARNINGS DATA

Two potential problems with Social Security earnings data are frequently cited--changes over time in the coverage of certain occupations, and truncation due to the upper bound for reported earnings. The following analysis indicates that these factors probably had a negligible effect on estimates of the effect of CETA training reported in this paper.[1]

CHANGES IN SOCIAL SECURITY COVERAGE

Not all jobs are covered by Social Security and thus not all earnings are reported by Social Security records. Therefore, earnings reported by Social Security records could artificially change because of changes in coverage (due to the increase over time in occupations covered by Social Security or due to individual shifts from covered to uncovered employment or vice versa). If this phenomenon occurred and if it affected CETA participants and comparison group members markedly differently, it could bias estimates of the effect of CETA training programs.

The likely magnitude of this potential bias was approximated by comparing Social Security earnings data for CETA participants with survey-based earnings data for the same group during the year before and the first year after training.[2] Comparable data for comparison group members were not available because survey earnings data were available only for one year.

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1. The truncation problem examined below only concerns measurement error in the dependent variable. It does not include the statistical problem of truncated samples.

2. Survey-based earnings data were obtained from the Continuous Longitudinal Manpower Survey. Survey data were also available for the second year after training, but only for a portion of the sample.

Table C-1 reports the ratio of mean earnings according to Social Security data relative to mean earnings according to survey data.[3] In almost all cases, this ratio was close to one, indicating a high degree of consistency between the two independent sources of earnings data.[4]

More important, however, is the fact that this ratio changed very little over time. It was 1.05 for female CETA participants in the year before training and 1.00 in the year after training, representing a 5 percent decrease (see Table C1). Corresponding results for male participants were 0.97 and 0.93, or a 4 percent decrease. Roughly comparable changes were experienced by participants in each of the different types of training.

To estimate the likely bias due to the preceding decreases in Social Security earnings coverage requires an estimate of the corresponding shift in coverage for comparison group members. Direct information about this shift was not available. But because there was no change in the Social Security law affecting the occupations that were covered during the analysis period, there was probably no shift in average coverage for the comparison group.

Thus the maximum likely relative shift for participants (the difference between their shift and that of comparison group members) was a 5 percent decline for women and a 4 percent decline for men. Based on the average first post-program-year earnings of $4,300 and $6,800 for female and male participants, respectively, these declines imply maximum likely negative biases of roughly $200 and $300 in estimates of the effect of training--not enough to affect the conclusions of this paper.

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3. Earnings were expressed in constant dollars to control for the slight timing mismatch between the Social Security and survey-based earnings data.

4. Both Social Security and survey-based earnings data contain random measurement error and thus are not as consistent for each individual as they are for group averages. These individual errors cancel each other and do not affect group averages appreciably. Because estimates of the effect of training are based on group averages, they are not biased by individual random measurement error in the dependent variable.

TABLE C-1. THE RATIO OF AVERAGE ANNUAL EARNINGS ACCORDING TO SOCIAL SECURITY DATA AND AVERAGE ANNUAL EARNINGS ACCORDING TO SURVEY DATA[a]

	Women			Men		
	Year Before Training	Year After Training	Percent Change	Year Before Training	Year After Training	Percent Change
All CETA Training	1.05	1.00	-5	0.97	0.93	-4
Classroom training	1.07	1.05	-2	1.07	0.99	-7
On-the-Job training	1.00	0.89	-11	0.98	0.95	-3
Work experience	1.03	0.98	-5	0.85	0.82	-4

a. Earnings from both data sources were expressed in 1980 dollars.

But this bias was probably even smaller, due to a potential shift in the coverage of earnings by the surveys. Pre-program earnings data were obtained from surveys administered while participants were in the program. Thus participants may have understated their pre-program earnings to protect their eligibility for the program. This was less likely to be the case for the post-program earnings data obtained from surveys administered after participants had left the program. Thus the ratio of Social Security to survey earnings may have overstated Social Security coverage during the pre-program year but not during the post-program year. If this were the case, the previous estimate of the decline in participants' Social Security coverage between these two years would be too large.

Because of the small size of this potential bias and lack of more precise information, estimates of the effect of training were not adjusted explicitly for it.

THE SOCIAL SECURITY REPORTING MAXIMUM

Only earnings up to a specified limit are covered by Social Security taxes, so earnings are reported only up to this limit.[5] If a substantial number of participants or comparison group members reached this limit for a number of years and this problem occurred more frequently during the pre-program period than it did during the post-program period (or vice-versa) and this disproportionate occurrence was more pronounced or entirely different for CETA participants than it was for comparison group members, then estimates of the effect of CETA training might be biased.

But few CETA participants or comparison group members ever reached the Social Security earnings maximum during the 1970-1978 pre-to-post-program analysis period (see Table C-2). This was especially true for female participants and for all comparison group members.

TABLE C-2. PERCENTAGE OF THE SAMPLE THAT REACHED THE SOCIAL SECURITY EARNINGS MAXIMUM BETWEEN 1970 AND 1978[a]

Percentage Who Reached the Maximum	Women			Men		
	One Time	Two Times	Three or More Times	One Time	Two Times	Three or More Times
All CETA Training	1	0	0	6	3	5
Classroom training	1	1	0	7	3	5
On-the-job training	2	0	0	7	4	9
Work experience	1	0	0	4	3	2
Comparison Group	0	0	0	3	1	0

a. Percentages do not sum across different types of training because the base for each group was different.

5. This upper bound was $7,800, $7,800, $9,000, $10,800, $13,200, $14,100, $15,300, $16,500, and $17,700 during the years 1970-1978, respectively (the analysis period for this study).

The 14 percent of the male participants who ever reached the earnings maximum during the nine-year analysis period did so primarily during the pre-program period (see Table C-3).[6] This probably produced a slight underestimate of post-program earnings in the absence of training, which probably overestimated the effect of training for men slightly. But due to the small proportion of male participants involved and the relatively infrequent occurrence of this phenomenon, its effect was probably negligible.

TABLE C-3. PERCENTAGE OF MALE CETA PARTICIPANTS WHO REACHED THE SOCIAL SECURITY EARNINGS MAXIMUM DURING THE PRE-PROGRAM AND POST-PROGRAM PERIODS

Number of Times During the Pre-Program Period	Number of Times During the Post-Program Period		
	0	1	2
0	86	1	0
1	5	0	0
2	3	0	0
3+	4	1	0

6. From 5 to 9 percent of the male participants reached the earnings maximum in any given year during this period.

APPENDIX D. ESTIMATING THE BIAS CAUSED BY CETA PARTICIPANTS IN THE COMPARISON GROUP

Because the comparison group was drawn from a national sample of U.S. residents (the Current Population Survey), it probably contained unidentified CETA participants. But the likely percentage of such unidentified participants was negligible and thus the effect of their presence (frequently referred to as contamination bias) was negligible.

NATURE OF THE PROBLEM

The model used to estimate the effect of training can be expressed as:[1]

$$Y_{it} = f(\bar{Y}_{it-s}, \bar{X}_i) + \sum_q \gamma_q \cdot T_{qit} + \gamma_c \cdot c_{it} + U_{it} \qquad (D1)$$

where:

Y_{it} = person i's earnings in year t;

$f(\bar{Y}_{it-s}, \bar{X}_i)$ = person i's expected earnings in year t without training, according to a vector of past earnings $\bar{Y}_{it-s}$ and a vector of personal characteristics, $\bar{X}_i$;

T_{qit} = one if person i had participated in the qth type of CETA training (classroom training, on-the-job training, or work experience) before year t, and zero otherwise;

c_{it} = one if person i was a comparison group member and year t was a year corresponding to a post-program year for participants, and zero otherwise;

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1. To simplify the discussion, this appendix expresses the basic model somewhat differently from the way it is expressed elsewhere in this paper. It also ignores the minor adjustment for the pre-program dip and the adjustment for inflation, neither of which would affect the conclusions of this appendix.

γ_q and γ_c = mean deviations from expected earnings for the qth type of training and the comparison group, respectively; and

U_{it} = a random disturbance.

$\hat{I}_q$, the estimated impact of training type q, can thus be expressed as:

$$\hat{I}_q = \hat{\gamma}_q - \hat{\gamma}_c \tag{D2}$$

where $\hat{\gamma}_q$ and $\hat{\gamma}_c$ are estimates of γ_q and γ_c. If there were no CETA participants in the comparison group then:

$$E(\hat{I}_q) = \gamma_q - \gamma_c \tag{D3}$$

and, in the absence of any other problems, one would obtain unbiased estimates of the impact of each type of training.

But if the comparison group contained CETA participants in proportion π_q, where:

$$\pi_c + \sum_q \pi_q = 1 \tag{D4}$$

then estimates $\hat{\gamma}_c$ obtained from Equation D1 would be biased. Consequently, estimates $\hat{I}_q$ would also be biased. To see this note that:

$$E(\hat{\gamma}_c) = \pi_c \cdot \gamma_c + \sum_q \pi_q \cdot \gamma_q \tag{D5}$$

and

$$E(\hat{\gamma}_q) = \gamma_q \tag{D6}$$

Thus:

$$\begin{aligned} E(\hat{I}_q) &= E(\hat{\gamma}_q) - E(\hat{\gamma}_c) \\ &= \gamma_q - \pi_c \cdot \gamma_c - \sum_q \pi_q \cdot \gamma_q \end{aligned} \tag{D7}$$

and

$$\begin{aligned} BIAS(\hat{I}_q) &= E(\hat{I}_q) - I_q \\ &= (1 - \pi_c)\gamma_c - \sum_q \pi_q \cdot \gamma_q \end{aligned} \tag{D8}$$

That is, the bias depends on the contamination proportions, π_q. If they were all zero (i.e., if there were no CETA participants in the comparison group) there would be no bias. But as these proportions increase, other things being equal, the bias increases.[2]

MAGNITUDE OF THE PROBLEM

To estimate the contamination bias, one must estimate the contamination proportions. Estimates of the largest likely proportions were obtained as follows for minority and non-minority men and women.

First, the size of the populations represented by the participant and comparison group samples were computed by summing their sampling weights accordingly (see Table D-1). Contamination proportions were then approximated by the ratio of the size of the participant population to the size of the comparison group population (see Table D-2).

For example, the sum of the weights for minority females indicated a participant population of 57,900 persons and a comparison group population of 5,530,900 persons. Thus 57,900/5,530,900 or 0.010 of the comparison group probably entered CETA training between January 1975 and June 1976. The corresponding results for non-minority females, minority males, and non-minority males were contamination proportions of 0.002, 0.013, and 0.005, respectively.

To complete the analysis, the presence of other CETA participants (public service employees and participants in multiple activities) plus earlier CETA participants (who entered in 1974) and later CETA participants (who entered by 1978) were accounted for as follows. The ratio of all CETA participants (including those in public service employment and multiple activities) over 24 years old who entered the program between January 1975 and June 1976 and stayed for more than seven days, to CETA participants included in Tables D-1 and D-2 was about 2.0.[3] In addition, according to data from Bassi (1982, p. 85), the ratio of all CETA

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2. For positive γ_q.

3. This ratio was estimated from the Continuous Longitudinal Manpower Survey.

TABLE D-1. PARTICIPANT AND COMPARISON GROUP POPULATION SIZE BY SEX, MINORITY STATUS, AND TYPE OF TRAINING[a]/

	Women		Men	
	Minority[b]/	Non-Minority[b]/	Minority[b]/	Non-Minority[b]/
All CETA Participants	57,900	64,700	55,800	77,000
In classroom training	37,600	30,500	27,900	24,400
In on-the-job training	7,000	10,000	10,900	22,400
In work experience	13,300	24,200	17,000	30,200
Comparison Group Members	5,530,900	27,508,700	4,293,400	16,865,600

SOURCE: Estimates were derived from the Continuous Longitudinal Manpower Survey and the March 1976 Current Population Survey.

a. For persons over 24 years old and in CETA training for more than seven days.

b. Non-minority persons included all white, non-Hispanic persons. Minority persons included everyone else.

TABLE D-2. CONTAMINATION PROPORTIONS RESULTING FROM 1975-1976 ADULT CETA PARTICIPANTS BY SEX, MINORITY STATUS, AND TYPE OF TRAINING[a]

	Women		Men	
	Minority[b]/	Non-Minority[b]/	Minority[b]/	Non-Minority[b]/
All CETA Participants	0.010	0.002	0.013	0.005
In classroom training	0.007	0.001	0.006	0.001
In on-the-job training	0.001	0.000	0.003	0.001
In work experience	0.002	0.001	0.004	0.002

a. For persons over 24 years old and in CETA training for more than seven days.

b. Non-minority persons included all white, non-Hispanic persons. Minority persons included everyone else.

entrants from the beginning of the program in 1974 through the end of the analysis period in calendar year 1978, to all entrants between January 1975 and June 1976 was about 3.1.[4]

To account for the presence of these additional participants in the comparison group, each of the contamination proportions in Table D-2 was multiplied by 2.0 times 3.1 or by 6.2. But this did not affect the results appreciably (see Table D-3). On balance it appeared that contamination bias was probably negligible.

TABLE D-3. CONTAMINATION PROPORTIONS INCLUDING ALL 1974-1978 ADULT CETA PARTICIPANTS BY SEX AND MINORITY STATUS[a]

	Women		Men	
	Minority	Non-Minority	Minority	Non-Minority
Adult CETA Participants	0.062	0.012	0.081	0.031

a. For persons over 24 years old and in CETA training, public service employment, or multiple activities more than seven days.

b. Non-minority persons included all white, non-Hispanic persons. Minority persons included everyone else.

4. See Laurie Jo Bassi, "Estimating the Effect of Training Programs with Nonrandom Selection," draft of Ph.D. dissertation, Economics Department, Princeton University (1982).

APPENDIX E. FINDINGS BY OTHER STUDIES ABOUT THE RELATIVE EFFECTIVENESS OF CLASSROOM TRAINING, ON-THE-JOB TRAINING AND WORK EXPERIENCE

Westat, Inc. (1981), Taggart (1981), the U.S. General Accounting Office (1982) and Bassi (1982) used the Continuous Longitudinal Manpower Survey to examine the effect of CETA training on participants' post-program earnings.[1] The first three studies used the same estimates of this effect--those obtained originally by Westat, Inc. These studies are hereafter referred to as Westat, et al. Bassi obtained independent estimates using a different statistical estimation procedure.

The results of these studies were similar in many respects to the results presented in this paper. But a key finding by Westat, et al--that on-the-job training worked best by a substantial margin--is directly contrary to the result of the present analysis of no statistically significant or substantively large difference among the effects on earnings of classroom training, on-the-job training or work experience.

As indicated below, however, the finding by Westat, et al that on-the-job training was most effective was based on a statistical model that undercompensated for the fact that participants in on-the-job training consistently earned more than participants in classroom training or work experience before they entered a CETA program.

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1. See Westat, Inc., Continuous Longitudinal Manpower Survey: Net Impact Report No. 1 (U.S. Department of Labor, March 1981). See Robert Taggart, A Fisherman's Guide: An Assessment of Training and Remediation Strategies (W.E. Upjohn Institute for Employment Research, 1981). See U.S. General Accounting Office, CETA Programs For Disadvantaged Adults--What Do We Know About Their Enrollees, Services and Effectiveness? (June, 1982). And see Laurie Jo Bassi, "Estimating the Effect of Training Programs With Nonrandom Selection," draft of Ph.D. Dissertation, Economics Department, Princeton University (1982).

The principal findings of these past studies are described below. Then a detailed discussion of the problem with the statistical model used by Westat, et al is presented.

SUMMARY OF FINDINGS

Bassi found large program-induced earnings gains for female participants with no clear pattern of differences by type of training. In addition, she found that female participants with the least past earnings experienced the largest earnings gains and that earnings gains for minority women were somewhat smaller than those for non-minority women.

Bassi concluded that the matched comparison groups for male participants developed by Westat, Inc., for the Continuous Longitudinal Manpower Survey (upon which she based her analysis) were not suitable for estimating the effect of training. Thus, except for one subgroup, she did not present results for men.

Westat, et al found: large earnings gains for female participants; that the largest gains accrued to women with the least past earnings; that earnings gains increased with the length of training; and that earnings gains were due mostly to increased employment. In addition, they found small earnings gains for men that were not statistically significant, on average. These results were basically consistent with the results of the present analysis. But contrary to the results of the present analysis, Westat et al found that on-the-job training was substantially more effective than classroom training or work experience in increasing the post-program earnings of participants.

PROBLEMS WITH THE STATISTICAL MODEL UPON WHICH THE RESULTS OF WESTAT et al WERE BASED

The following is a discussion of why the model upon which the results of Westat et al were based undercompensated for the fact that participants in on-the-job training consistently earned more than participants in classroom training and work experience before they entered a CETA program.

The Statistical Model

The model used by Westat, et al to estimate the effect of training can be expressed as:

$$Y_{it} = a + \sum_s b_s \cdot Y_{it-s} + \sum_j \delta_j \cdot X_{ji} + \sum_q \gamma_q \cdot T_{qit} + U_{it} \qquad (E1)$$

where:

Y_{it} and Y_{it-s} = person i's earnings in post-program year t and pre-program year t-s;

X_{ji} = the jth personal characteristic for person i;

T_{qit} = one if person i had been in training activity q (classroom training, on-the-job training, or work experience) and zero otherwise;

γ_q = the average effect on future earnings of training type q;

a, b_s and δ_j = other parameters to be estimated; and

U_{it} = a random disturbance.

Numerous versions of this model (first developed by Orley Ashenfelter (1978) and commonly referred to as an autoregressive earnings model) were used, yielding a broad range of results.[2]

Problems with the Model

For reasons explained below, autoregressive earnings models do not fully compensate for differences in the average pre-program earnings of different groups. Thus part of these initial differences are reflected in estimates of the relative effect of training.

Table E-1 indicates that participants in on-the-job training consistently earned more before entering CETA than their counterparts in classroom training and work experience did. By undercorrecting for these differences, autoregressive models will overestimate the effect of on-the-job training relative to that of classroom training and work experience.

The following is a brief explanation of why this problem occurs. To simplify the discussion without limiting its

2. See Orley Ashenfelter "Estimating the Effect of Training Programs on Earnings," The Review of Economics and Statistics, vol. LX, no. 1 (February 1978), pp. 47-57.

TABLE E-1. AVERAGE PRE-PROGRAM EARNINGS BY SEX, TYPE OF TRAINING, AND PRE-PROGRAM YEAR (In nominal dollars)[a]

Sex and Type of Training	Pre-Program Year				
	1970	1971	1972	1973	1974
Female CETA Participants					
In classroom training	730	810	1,010	1,240	1,370
In on-the-job training	890	1,020	1,280	1,500	1,660
In work experience	570	610	750	930	1,070
Male CETA Participants					
In classroom training	1,400	1,540	2,040	2,640	2,800
In on-the-job training	1,760	1,990	2,670	3,280	3,590
In work experience	1,130	1,220	1,540	1,840	1,780

SOURCE: Estimates were derived from the Continuous Longitudinal Manpower Survey supplemented by individual Social Security earnings records.

a. For persons of all ages in CETA training for more than seven days.

generality, the personal characteristics X_{ji} were deleted from Equation E1 yielding:[3]

$$Y_{it} = a + \sum_s b_s \cdot Y_{it-s} + \sum_q \gamma_q \cdot T_{qit} + U_{it} \qquad (E2)$$

3. Problems of covariance adjustments such as those produced by the personal characteristics are widely recognized. For example, see S. Director, "Underadjustment Bias in the Evaluation of Manpower Training," Evaluation Quarterly, vol. 3, (May 1979).

Past studies indicate that earnings increase at a decreasing rate throughout one's working life.[4] For shorter periods (ten years or less) earnings profiles are approximately linear. Estimates of the effect of training based on autoregressive earnings models such as Equation E2 are biased when the profiles (either linear or nonlinear) of participants (by type of training) and comparison group members are different (which was the case for the Westat, et al analysis). For example, linear earnings profiles imply that:

$$Y_{it} = \alpha_i + \beta_i \cdot t + \sum_q \gamma_q \cdot T_{qit} + U_{it} \qquad \text{(E3)}$$

where α_i and β_i are the intercept and slope of person i's pre-program earnings profile. Now consider the results of estimating the effect of training using an autoregressive earnings model from data generated by Equation E3.

Start with a first-order autoregressive model--one based on a single pre-training year--with s years between the post-program year and the pre-program year. Differencing Equation E3 accordingly yields:

$$Y_{it} - Y_{it-s} = \sum_q \gamma_q \cdot T_{qit} + U_{it}' \qquad \text{(E4)}$$

or

$$Y_{it} = Y_{it-s} + \sum_q \gamma_q \cdot T_{qit} + U_{it}' \qquad \text{(E5)}$$

where

$$U_{it}' = S \cdot \beta_i + U_{it} - U_{it-s} \qquad \text{(E6)}$$

Using Equation E5 to determine the effect of training involves estimating coefficients for both Y_{it-s} and T_{qit}. If the coefficient for Y_{it-s} were estimated without bias (by constraining it to one as in Equation E4) the estimated coefficient for T_{qit} would be biased because of the correlation between T_{qit} and β_i in the error term. For example, if participants' earnings were increasing more slowly than those of comparison group members (T_{qit} and β_i were correlated negatively) the coefficient for T_{qit} (the effect of training activity q) would be underestimated. Furthermore, the magnitude of this bias would increase as s, the

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4. See J. Mincer, Schooling, Experience and Earnings (National Bureau of Economic Research, 1971).

number of years between the pre-program year and post-program year, increased.

Additional problems arise from bias in the estimated coefficient for Y_{it-s} because of the correlation between Y_{it-s} and β_i, controlling for T_{qit}. And, lastly, if U_{it} and U_{it-s} were serially correlated, another source of bias would exist.

Unbiased training effect estimates would result only if: (1) the earnings profiles of comparison group members and participants in all three types of training were identical (in which case, it would be unnecessary to control for past earnings to eliminate bias) or (2) the biases mentioned above cancelled each other (a remote possibility).

The preceding result generalizes to higher-order autoregressive models by further differencing Equation E3 and generalizes to nonlinear earnings profiles by substituting an appropriate functional form into Equation E3. For example, one might substitute ln(t) for t to represent earnings that increased over time at a decreasing rate.

APPENDIX F. COMPONENTS OF THE AVERAGE EARNINGS GAIN EXPERIENCED BY FEMALE PARTICIPANTS

Chapter III indicated that most of the average earnings gain experienced by female CETA participants was due to an increase in the amount of time they worked rather than increased wage rates. This appendix describes how this and other related results were obtained and discusses their interpretation and limitations.

BASIC APPROACH

By definition, annual earnings can be decomposed as follows:

$$Y = L \cdot (E/L) \cdot (H/E) \cdot W \qquad (F1)$$

where:

- Y = annual earnings;
- L = the number of weeks that an individual was available for employment during the year;
- (E/L) = the number of weeks that an individual was employed during the year as a proportion of the number of weeks that he or she was available for employment;
- (H/E) = the average number of hours worked per week employed; and
- W = the average hourly wage rate.

The proportional change in earnings, $\Delta Y/Y$, equals the sum of the proportional change in each of its four components plus the sum of all interactions among the proportional changes in these components. In general the interactions are small so that:

$$(\Delta Y/Y) \approx (\Delta L/L) + [\Delta(E/L)/(E/L)] + [\Delta(H/E)/(H/E)] + \Delta W/W \qquad (F2)$$

Therefore the proportion of the change in earnings due to a change in one of its components approximately equals the proportional change in that component as a proportion of the sum of the proportional changes in all components. For example, the proportion of the change in earnings due to a change in labor force participation approximately equals

$$(\Delta L/L)/[(\Delta L/L) + [\Delta(E/L)/(E/L)] + [\Delta(H/E)/(H/E)] + (\Delta W/W)].$$

This procedure implicitly allocates each component's contribution to the interaction terms in proportion to its contribution to the sum of the terms in Equation F2.

DATA AND ANALYSIS

Earnings component data were not available for the full multiyear period upon which estimates of post-program earnings gains were based. Complete data for participants were available from the Continuous Longitudinal Manpower Survey only for the year before and the first year after training,[1] whereas corresponding data for comparison group members were available from the Current Population Survey for only one year (1975).

Thus it was necessary to infer the composition of post-program earnings gains from the observed composition of the gross change in participants' earnings from the year before to the first year after training (see Table F-1). Applying the computational procedure described above to this information produced estimates of the composition of post-program earnings gains (see Table F-2).

INTERPRETATIONS OF THE FINDINGS

Although subject to limitations, the results in Table F-2 support several broad generalizations about the effect of CETA training for women.

First, even conservative estimates indicate that the effect of training was substantial. For example, three-fifths of the average post-program earnings gain observed for female

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1. Data for the second year after training were available for only part of the sample.

TABLE F-1. THE COMPONENTS OF EARNINGS FOR FEMALE CETA PARTICIPANTS BEFORE AND AFTER TRAINING

	Average Weeks in the Labor Force	Average Weeks Employed as a Proportion of Weeks in the Labor Force	Average Hours Worked per Week Employed	Average Hourly Wage Rate (in 1980 Dollars)
All Female Participants				
Year before training	35	0.47	33	3.81
Year after training	41	0.62	38	4.49
Female Classroom Training Participants				
Year before training	34	0.45	34	3.77
Year after training	40	0.57	38	4.65
Female On-The Job Training Participants				
Year before training	35	0.51	36	3.99
Year after training	45	0.73	39	4.46
Female Work Experience Participants				
Year before training	36	0.50	31	3.76
Year after training	41	0.64	36	4.19

TABLE F-2. PERCENTAGE OF THE AVERAGE EARNINGS GAIN EXPERIENCED BY ADULT FEMALE PARTICIPANTS DUE TO EACH OF THE FOUR BASIC COMPONENTS OF EARNINGS

	Percentage Due to Average Annual Change In:				
For Women In:	Weeks in the Labor Force	Weeks Employed as a Percentage of Weeks In the Labor Force	Hours Worked per Week Employed	Real Hourly Wage Rate	Total
All CETA Training	21	39	18	22	100
Classroom training	22	34	15	29	100
On-the-job training	31	47	9	13	100
Work experience	20	41	23	16	100

SOURCE: Estimates based on the information in Table F-1.

participants remained after eliminating the portions due to increased labor force participation and increased hours worked per week employed. This left roughly $800 due solely to increased abilities to find and hold a job and to increased wage rates.

A second major generalization supported by the results in Table F-2 is that the effects of the three different types of training were roughly the same in terms of their magnitude and to a large extent also in terms of their composition. Chapter III indicated that average post-program earnings gains were $1,400, $1,100, and $1,300 for women in classroom training, on-the-job training, and work experience, respectively. Table F-2 indicates that 63, 60, and 57 percent of these gains respectively were due to the effect of increased wage rates and increased abilities to find and hold a job.

Lastly, a third important generalization supported by the data is that most (71 percent for classroom training, 87 percent for on-the-job training, and 84 percent for work experience) of the average earnings gain experienced by female CETA participants was due to an increase in the amount of time they worked.

LIMITATIONS OF THE FINDINGS

Several potential problems limit more precise interpretation of the preceding results. First is the fact that gross earnings changes (upon which the earnings component analysis was based) do not overlap perfectly with post-program earnings gains (to which the results of this analysis were inferred). Nevertheless the average post-program deviation from trend in the first year after training (Segment C in Figure F-1), which largely determined the average post-program earnings gain for that year,[2] comprised about three-fifths of the average gross earnings change for female participants (Segments A plus B plus C). Thus there was a substantial overlap between the two measures of change in earnings.

A second potential problem stems from the fact that data for the components of earnings were obtained from retrospective surveys. Participants were asked on a quarter-by-quarter basis about the extent to which they sought employment, the percentage of time they were employed, their wage rates, and their total earnings. Undoubtedly, this produced numerous reporting errors. But individual reporting errors largely cancelled each other in the determination of the group averages upon which the present analysis was based. For example, Appendix C indicated that average earnings obtained from survey data generally were within 5 percent of corresponding average earnings obtained from Social Security records. Thus it is unclear to what extent, if at all, survey errors were a problem for this analysis.

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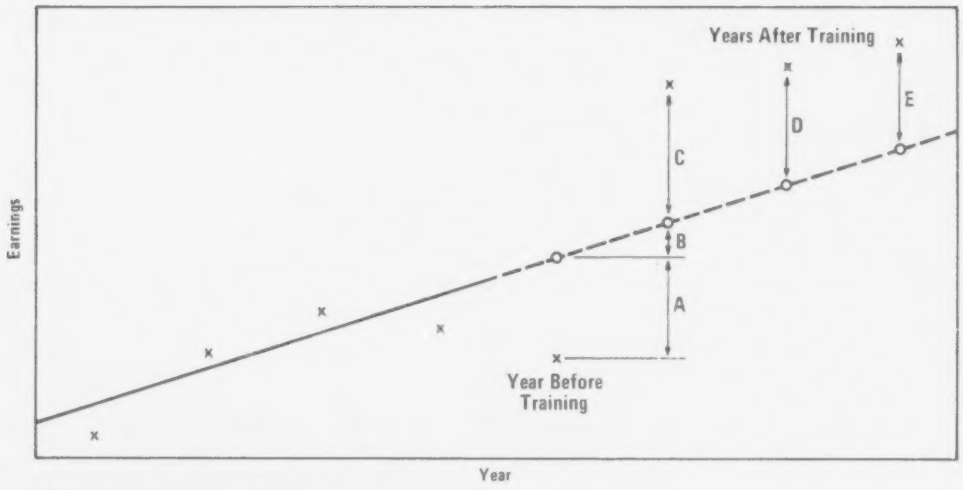
2. Post-programs earnings gains actually represent the average of segments C, D, and E in Figure F-1 minus their comparison group counterparts (which are not shown but were quite small) with a slight adjustment for the pre-program dip.

Figure F-1.

Post-Program Earnings Gains versus Gross Earnings Changes



KEY:

A = Recovery from pre-program dip
B = Earnings increase according to long-term trend
C = Deviation from trend in the first year after training
D = Deviation from trend in the second year after training
E = Deviation from trend in the third year after training

APPENDIX G. EXAMINING THE RELATIONSHIP BETWEEN POST-PROGRAM EARNINGS GAINS AND THE LENGTH OF TRAINING

Longer training was associated with larger post-program earnings gains for female CETA participants at a rate of $3.70 per day, on average. On the other hand, there was generally no significant effect for male participants, regardless of the length of training.

ANALYSIS

Appendix A developed the following model for estimating the average effect of training:

$$\hat{\hat{DEV}}_{it}^{*} = \gamma^{*} \cdot T_{it} + \sum_{j} \delta_{j}^{*} \cdot X_{ji} + \sum_{m} \epsilon_{m}^{*} \cdot YR_{m} + U_{it}^{*} \qquad (G1)$$

where:

$\hat{\hat{DEV}}_{it}^{*}$ = the post-program year deviation from trend adjusted for serial correlation, in 1980 dollars;

T_{it} = one for participants and zero for comparison group members;

YR_{m} = one when year t=m and zero otherwise;

ϵ_{m}^{*} = the average deviation from trend in year m due to changing economic conditions, in 1980 dollars;

X_{ji} = the jth personal characteristic for person i;

γ^{*} = the average effect of training, in 1980 dollars; and

U_{it}^{*} = a random disturbance, in 1980 dollars.

Adding an interaction between the training variable T_{it} and the length of training L_{i} (in days) produced a variable whose coefficient measured the additional gain in average annual post-program earnings per additional day of training. Replacing T_{it}

with a set of dummy variables T_{qit} --one for each of the three major types of training--and interacting each of these new variables with L_i , produced a set of interaction terms whose coefficients measured the additional gain in average post-program earnings per additional day of each type of training.

Estimates of these coefficients indicated that an additional day of training was associated with a $3.70 increase in the average annual post-program earnings of female participants (see Table G-1). Similar results were obtained for each of the three major types of training. On the other hand, none of the three types of training appeared to increase the future earnings of male participants, regardless of the length of the training.

To test for increasing or decreasing returns to additional days of training, quadratic interaction terms were added to the model, but the coefficients for these terms were not statistically significant, suggesting roughly constant returns to additional days of training within the range of program lengths examined (about 10 to 250 days).

TABLE G-1. THE MARGINAL CHANGE IN ANNUAL POST-PROGRAM EARNINGS ASSOCIATED WITH AN ADDITIONAL DAY OF TRAINING BY SEX AND TYPE OF TRAINING (In 1980 dollars)[a]

Type of Training	Women	Men
All CETA Participants	3.70[c]	-1.00
In classroom training	3.60[c]	2.80
In on-the-job training	6.50[c]	-7.80[c]
In work experience	2.90[b]	-1.90

SOURCE: Estimates were derived from the Continuous Longitudinal Manpower Survey and the March 1976 Current Population Survey supplemented by individual Social Security earnings records.

a. For persons over 24 and in CETA training for more than seven days.

b. Significant at the 0.05 level.

c. Significant of the 0.01 level.

APPENDIX H. COMBINING RESULTS FOR DIFFERENT GROUPS OF PARTICIPANTS, DIFFERENT POST-PROGRAM YEARS, AND DIFFERENT TYPES OF TRAINING

To summarize estimates of the effect of CETA training on participants' future earnings, it was necessary to combine these estimates for as many different groups as possible. Empirical tests indicated that there were no statistically significant differences: (1) between participants who entered the program early in the analysis period (from January through August 1975) and participants who entered later (from September 1975 through June 1976); (2) among the results for each of the first three post-program years; (3) among the results for each of the three major types of training; and (4) between the results for minority and nonminority participants. Thus it was appropriate to combine these results. On the other hand, differences between the findings for male and female participants were both statistically significant and large. Thus results for these groups were not combined.

TESTING PROCEDURE

Appendix A developed the following model for estimating the average effect of CETA training:

$$\hat{\hat{D}}\hat{E}V_{it}^{*} = \gamma^{*} \cdot T_{it} + \sum_{j}\delta_{j}^{*} \cdot X_{ji} + \sum_{m}\epsilon_{m}^{*} \cdot YR_{m} + U_{it}^{*} \qquad (H1)$$

where:

$\hat{\hat{D}}\hat{E}V_{it}^{*}$ = the post-program year deviation from trend adjusted for the pre-program dip, in 1980 dollars;

T_{it} = one for participants and zero for comparison group members;

YR_{m} = one when year t = m and zero otherwise;

ϵ_m^* = the average deviation from trend in year m due to changing economic conditions, in 1980 dollars;

γ^* = the average effect of training, in 1980 dollars;

X_{ji} = The j^{th} personal characteristic for person i; and

U_{it} = a random disturbance, in 1980 dollars.

To test for significant differences in estimates of γ^* (the effect of training) across each of the groups mentioned above, the program variable was interacted with variables representing each group, including all possible higher-order interactions. The full resulting model was then estimated. It was then reestimated sequentially after first eliminating distinctions between entry groups; after next eliminating distinctions by post-program year; after next eliminating distinctions by type of training; after next eliminating distinctions by minority status of the participant; and lastly after eliminating distinctions by sex of the participant. To minimize the substantial computational costs involved, only data for participants were used.

At each stage an F statistic was computed to determine whether or not eliminating a specific distinction decreased the explanatory power of the model by a statistically significant amount. No distinctions other than sex were statistically significant at the 0.05 level (see Table H-1). Thus combining results across all dimensions except sex appeared to be justifiable.

TABLE H-1. F TESTS FOR POOLING RESULTS BY CETA ENTRY GROUP, POST-PROGRAM YEAR, TYPE OF TRAINING, MINORITY STATUS, AND SEX[a]

Pooling Sequentially	F Statistic[b]	Significant at the 0.05 Level[b]
First by Entry Group	0.8	No
Then by Post-Program Year	0.5	No
Then by Type of Training	0.8	No
Then by Minority Status	1.5	No
Then by Sex	14.3[c]	Yes[c]

SOURCE: Estimates were derived from the Continuous Longitudinal Manpower Survey and the March 1976 Current Population Survey supplemented by individual Social Security earnings records.

a. For persons over 24 years old who were in CETA training more than seven days.

b. Each F test was conditional upon the elimination of prior distinctions in the sequence and the sequence was based on expectations about the likely importance of each distinction.

c. Significant at the 0.01 level.